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REGISTER of the SMALL-POX in CHESTER, 1778.

i.		ii.	iii.	iv.	v.	vi.	vii.	viii.	ix.	x.	xi.
Order.	PATIENTS. Name. No.	Street.	Occupation.	Small-Pox Fe- ver began.	Date of In- formation.	Gratis Rules, or Pro- missory Notes.	Whence infected.	Date of Death, or Last Scab.	Washed and aired.	Infection communi- cated to	Rules observed or transgressed.
1.	E. Bryly 2	Sty-lane.	Fisherman.	1778, Jan.	Jan. 30.	P. N. Jan. 30.				none.	observed.
2.	M. Morris 2	Bridge-st.	Flour-dealer.	March 24.	April 3.	P. N. April 3.		April 25.	April 26.	Coleclough's 4th Family.	transgressed.
3.	A. Collier 2	Northg.-st.	Bricklayer.	April 7.	April 14.	P. N. Ap. 14.		L. S. Ap. 29.	April 30.	none.	observed.
4.	H. Coleclough 2	Bridge-st.	Labourer.	1st, Ap. 23. 2d, May 3.	April 26.	P. N. Ap. 26.	Morris's 2d F.			none.	observed.
5.	Mr. Smith 1	Bridge-st.	Watch-mak.	April 22.	April 24.	G. R. Ap. 24.		L. S. May 4.	May 5.	none.	observed.
6.	A. Singleton 2	Northg.-st.	Labourer.	May 6.	May 10.	P. N. May 10.	Liverpool.			Ashton's 7th F.	transgressed.
7.	E. Ashton 2	Northg.-st.	Labourer.	1st May 30. 2d June 14.	June 4.	P. N. June 4.	Singleton's 6th F.	June 23.	June 24.	none.	observed.
8.	H. Price 1	Gorse-St.	Shoemaker.	May 29.	June 8.	P. N. June 8.		July 6.	July 8.	none.	observed.
9.	E. Evans 2	Bars.	Cobler.	May 30.	June 13.	P. N. June 13.	Croughton.	June 27.	June 27.	10, 11, 12, 13, Families.	transgressed.
10.	A. Conolly 1	Bars.	Baker.	June 18.	June 23.	P. N. June 23.	Evans's 9th F.	July 10.	July 10.	none.	observed.
11.	C. Jones 1	Bars.	Weaver.	June 22.	June 25.	P. N. June 25.	Evans's 9th F.	July 14.	July 15.	none.	observed.
12.	H. Huxley 2	Bars.	Newsman.	June 20.	June 25.	P. N. June 25.	Evans's 9th F.	July 14.	July 15.	Smith's 17th F.	transgressed.
13.	Mr. Jenkin 1	Bars.	Tanner.	June 16.	June 26.	G. R. June 26.	Evans's 9th F.	July 14.	July 15.	Morris's 15th F.	transgressed.
14.	E. Alsop 1	Bars.	Soldier.	July 9.	July 11.	P. N. July 12.	10th, 11th, 12th, or 13th Families.	July 29.	July 29.	Downing 16 F.	transgressed.
15.	M. Morris 1	Forest-st.	Shoemaker.	July 20.	July 23.	P. N. July 23.	Jenkins's 13th F.	August 3.	Aug. 4.	none.	observed.
16.	A. Downing 1	Bars.	Sailor.	July 23.	July 27.	P. N. July 28.	Alsop 14th F.	August 2.	Aug. 4.	none.	observed.
17.	A. Smith 2	Bunce-la.	Glazier.	July 22.	Aug. 6.	P. N. Aug. 6.	Huxley 12th F.	August 21.	Aug. 21.	none.	observed.
18.	E. Tilston 1	Forest-st.	Shoemaker.	Sept. 10.	Sept. 26.	P. N. Sept. 26.		October 7.	Oct. 8.	none.	observed.
19.	E. Johnson 1	Gorse-St.	Labourer.	October 4.	Oct. 5.	P. N. Oct. 5.		October 14.	Oct. 15.	none.	observed.
20.	L. Bellis 3	Crooks-la.	Coachman.	1. Oct. 21. 2. Nov. 2. 3. — 3.	Oct. 29.	P. N. Oct. 30.		Nov. 27.	Nov. 21.	none.	observed.

AN
INQUIRY
HOW TO PREVENT THE
SMALL - POX.

AND
PROCEEDINGS OF A SOCIETY
FOR
Promoting GENERAL INOCULATION at stated periods, and
preventing the Casual SMALL-POX in CHESTER.

———— culpam compesce, priusquam
Dira per incautum serpsit contagia vulgus.
VIRG. GEORG. iii. 468.

A NEW EDITION, WITH ADDITIONS.



BY
JOHN HAYGARTH, M.D.

F.R.S. LOND. F.R.S. AND R. M.S. EDINB. AND OF THE AMERICAN
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1801.

TO THE
M E M B E R S
OF THE
SMALL-POX SOCIETY,
IN CHESTER.

FRIENDS AND FELLOW-CITIZENS,

TO you the following pages are addressed, with sentiments of sincerest gratitude. To your humanity and munificence, the Institution, which is founded on the principles of this INQUIRY, owes its existence. To you I appeal, as witnesses intimately acquainted with the facts, on which the argument depends, that they are stated with accuracy and fidelity.

To the medical members I gladly return my thanks, for their candid acquiescence in
the

the proposal of a SMALL-POX Society, and for their countenance and assistance in its execution. It is with peculiar pleasure, that, upon this occasion, I express the high satisfaction which I feel, on reflecting, that I have had the happiness to enjoy with you a friendly intercourse of mutual good offices for more than *seventeen* years, without the smallest interruption. While emulation has excited among us the most sedulous care of our patients, it has never, I believe, in a single instance, produced invidious detraction, or dissention, effects of those malignant passions, which too often are injurious and disgraceful to the profession. This circumstance claims particular notice on the present occasion: because, the slightest breath of medical opposition, from whatever motive it might have proceeded, must inevitably have destroyed so unpopular an establishment. To you, I appeal, not only as witnesses of the facts, but as judges, whether the argument deduced from them be

conclusive.

conclusive. You can all bear testimony that the experience of the Society, for six years, has not excited a *medical* doubt, that the *Rules of Prevention* submitted to your consideration in the original proposal have proved fully adequate to their purpose. A publick establishment, for so long a period, has supplied more numerous and more authentick facts, than the private practice of any Physician, during his whole life.

To the other members of the Committee I return my grateful acknowledgments for their steady support, amidst all the prejudices and discouragements which opposed this Institution. To the high opinion which your fellow-citizens so justly entertain of your good sense and humanity, it is chiefly to be attributed, that the society was established. To your chairman, THOMAS FALCONER, esq; with whose intimate friendship I have been long blest, I owe the greatest obligations, on this and many other occasions. Being not more distinguished
by

by his great learning and the excellence of his understanding, than by the benevolence of his heart, his assiduous zeal in forwarding this Institution had the most beneficial influence in promoting its success.

I cannot but express, with a painful recollection, my regret for the loss of many deceased subscribers, who were very sincere and active friends to the charity; a loss which will be long lamented in this place, and was particularly unfortunate in the infancy of this Society.

I gratefully return my particular thanks for some contributions, which I have reason to think were intended as personal favours.

Before this Society commenced, half as many children under ten years old died of the SMALL-POX, in Chester, as of all other diseases. It is, beyond all comparison, the most mortal Pestilence that has visited this island for more than a century past. Your proceedings have clearly proved, that it is medically possible to exterminate this Pestilence.

tilence. You have seen, not only the medical principles, but the practical rules so firmly built, on the foundation of facts, that they can never be shaken by any temporary or local prejudice.

There is just reason to hope that the benefit of this institution may extend farther than this place. And it will ever be remembered, that such benefit was derived from the humanity, the generosity, and the enlightened knowledge of the citizens of Chester. A view of such enlarged beneficence to mankind will give the most cordial satisfaction to you, as well as to

Your sincerely affectionate,

And faithful humble Servant,

J. H.

Chester, 1784.

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AN
INQUIRY
HOW TO PREVENT THE
SMALL-POX.

INTRODUCTION.

IT is with great diffidence that I venture to advance objections against generally received opinions, on a subject which has been open to every man's observation for above a thousand years, and which has, for more than a century past, been frequently discussed by the most judicious and sagacious authors. But the SMALL-POX is of such high concernment to mankind, that every effort, however inadequate, to check its fatal ravages, will be received, I trust, with peculiar indulgence.

There are two opinions, which have so generally prevailed as to repress every attempt, in this country, to prevent the SMALL-POX. 1. Clothes, &c. exposed to the Variolous Effluvia, are supposed, I believe

lieve universally, to retain an infectious quality. And 2. When the Distemper is epidemical, the whole atmosphere of the place is thought to be contaminated. To these points I particularly request the reader's attention.

It may be necessary to state, that, in this INQUIRY, I do not consider imaginary prejudices. 1. How long a time the clothes, &c. which have been exposed to the Variolous Effluvia, are supposed to retain their infectious quality, may be differently estimated, this subject having never been, that I know of, particularly considered. A Physician* of the most respectable authority, when asked whether he thought that the doctrine, on this point, advanced in the INQUIRY, was true, positively asserted, that ‘ he had known a
‘ medical wig, exposed to the effluvia of a
‘ SMALL-POX chamber in London, which,
‘ after travelling to Plymouth, had retained
‘ such an infectious quality as to commu-

* The late Dr. JOHN FOTHERGILL.

‘ nicate

‘ nicate the Distemper to a person in that
 ‘ town.’ If clothes, &c. can be supposed
 to retain the Pestilential Effluvia, for so long
 a time and so distant a journey, no person
 liable to the Distemper can be secure from
 danger. It would be utterly impossible to
 guard against such unthought of mischief.

2. When a manuscript copy of these pa-
 pers, and the printed *Proposal* of a SMALL-
 Pox Society in Chester, were circulated
 among my acquaintance, I was favoured
 with the following remark, by a most in-
 telligent medical friend, Dr. SMITH of
 Birmingham: ‘ Strange it is that physical
 ‘ people should have generally admitted,
 ‘ that the common atmosphere was so af-
 ‘ fected when the SMALL-POX became
 ‘ epidemick, as to be universally infec-
 ‘ tious! And yet true it is. When I first
 ‘ discoursed with — — —* on the papers,
 ‘ and told him how confined the efficacy
 ‘ of the poison seemed to be, and that, in
 ‘ the open air, I believed it would, in or-

* The late Dr. ASH, of Birmingham. ‘ dinary,

‘ dinary, scarcely extend to the boundary
‘ of a circle of a yard radius; he treated
‘ the assertion as in the highest degree ab-
‘ surd, and at once ventured to affirm, that
‘ he had “ known it to extend *thirty miles!*”
‘ How loosely have these matters been con-
‘ sidered!’ Now if the Variolous Poison
could render the atmosphere infectious to
the distance of *thirty yards* only, any hu-
man attempts to stop the progress of this
Pestilence in a town or village would ma-
nifestly be most absurd.

Each of these opinions was advanced by
a Physician of the most extensive observa-
tion, and clear discernment, being justly
celebrated as the most eminent in the pro-
fession. And to such a degree do these
notions prevail, that, I believe, if other
medical men had been witnesses of the
facts here alluded to, in both cases, many
would have drawn the same conclusions.

It will be most candid to confess that the
Theory advanced in this INQUIRY, in nearly
every

every instance, suggested the observation of facts. This being the truth, it will not be deemed an unnecessary caution that I have used, in adding the testimony of others, which may be thought more impartial than my own, concerning the facts that might appear most extraordinary, according to the prevailing idea on this subject. I allow that many false and even injurious medical Theories have been devised. But, on the other hand, I maintain, that unconnected facts afford no information; that facts are instructive and useful just in proportion as they are reducible to general rules or laws; and that true Theories, in this, as in other branches of natural philosophy, lead to a more exact observation and relation of facts. No person could describe the effects of lightning so exactly as an electrician. Having observed that many medical theories are mere metaphors, and thinking all metaphorical language, on such subjects, a delusive and misplaced kind of elegance, I have endeavoured

endeavoured to avoid every figurative allusion. By this remark, I cannot be thought to exclude arguments from analogy, a just mode of reasoning, founded on the uniformity of Nature's works.

In the year 1774, the casual SMALL-Pox was so dreadfully fatal to the poor inhabitants of Chester, as to produce a deep impression upon my mind, especially when I considered that it was possible to prevent such destruction. Ever since that time, it has been an object of my most anxious wishes to preserve their lives by Inoculation.

In 1777, when the SMALL-Pox was again epidemical, I ventured to propose a plan for this purpose; at first, for some months, privately, and in March 1778, publicly, which was not disapproved by the Faculty, nor by our most intelligent citizens. But this undertaking was attended with so many difficulties, real and imaginary, that a general inoculation of the poor was not executed till 1780.

As

As I was meditating on some safe mode of general inoculation, I happened to write down my thoughts on a small serap of paper, in order to consider more distinetly, by what means Infection might be prevented from spreading, if such a measure were attempted. Doubts occurred to me concerning the opinions above-mentioned. On farther consideration, these doubts increased, and I gradually became thoroughly convinced that both the opinions were erroneous, which have hitherto formed the bar, and, if they were true, the insuperable bar to all human means of preventing the SMALL-POX. Though I have long acquired a perfect conviction upon these points, from the principles explained in the INQUIRY, yet a diffidence in disputing opinions which had been admitted so long and so generally among Physicians, indueed me to solicit the unreserved criticism of my friends, where ever I could take that liberty. For seven years, these papers have
been

been circulating among my medical and philosophical acquaintance; I requested them freely to state their objections, and to send me explicit answers to the *Queries* annexed to the INQUIRY; and to induce them to propose their remarks without reserve, I engaged not to publish their names, whether they approved or disapproved the doctrine I endeavoured to establish. I return, to these obliging correspondents, my grateful thanks, for this private favour, and acknowledge the cordial satisfaction which their approbation has afforded me. But, on this occasion, I willingly observe the promised silence, being desirous to convince by argument, not to persuade by authority. It may suffice to say, in general, that every objection with which I have been honoured, is fully stated in the INQUIRY, that the reader may form his own judgment on the subject.

AN
INQUIRY
HOW TO PREVENT THE
SMALL-POX.

§ I.

The SMALL-POX is an infectious Distemper.

THE truth of this proposition is proved, beyond all possibility of doubt, by the daily practice of Inoculation.

§ II.

The SMALL-POX was never known, since its original commencement, to be produced by any other cause than Infection.

That at present it is occasioned neither by climate, soil, nor season, but by Infection *only*, seems highly probable from the following

following facts: The world had existed between four and five thousand years before history takes any notice of this Distemper. It is universally allowed to have been originally epidemick in or near Arabia. All Europe was infected from this place, and all other parts of the world that were then known, or have since been discovered. It did not appear in Greenland till 1733: the Infection was carried thither by a native returning home in the Distemper from Copenhagen.* In Minorca, it entirely disappeared from 1725 till 1742, that is, for seventeen years. In 1745, it was again brought to Minorca by one of his Majesty's ships: and there can be no doubt that the former Infection was imported by some ship, though unnoticed by the author.† At Boston in New-England, the SMALL-POX has been epidemical only eight times, from the first settlement of the province of Mas-

* Crantz's History of Greenland, b. v. § 8.

† Cleghorn's Diseases of Minorca, chap. viiith.

sachusetts, till 1752, as appears from the following Table, composed out of Dr. DOUGLASS's* Historical and Political Summary of North-America:

Epidemical SMALL-POX at Boston.	Years absent.
1649	
1666	17
1678	12
1689	11
1702	13
1721	19
1730	9
1752	22

Before the epidemick of 1721, the SMALL-POX was imported from Barbadoes; before that of 1730, from Ireland; and before that of 1752, from London.

At Rhode Island in America, this Distemper was *never* epidemical, according to authentick intelligence which I have received from Dr. MOFFATT, who practised physick at Newport, their capital, from 1740 till 1765; and from Dr. WATER-

* Vol. ii. p. 392.

HOUSE, a native of the island. The former gentleman acquainted me with this fact, in these words, ‘ The SMALL-POX was ‘ never epidemical during my residence at ‘ Rhode Island, nor before that I ever ‘ heard of. As far as I can recollect, there ‘ never was, at the same time, more than ‘ five or six ill of the Distemper.’ Such an happy exemption is accomplished by regulations established there for the purpose.* This proposition is capable of many other proofs, unnecessary to be here adduced, as at present, I believe, it is an opinion very generally received among Physicians.

§ III.

The Variolous Poison is soluble in air.

The infection of the SMALL-POX is termed a *Poison* by medical writers, and with strict propriety.

It is of importance to ascertain the mode of combination between the Variolous Poi-

* See Appendix to the INQUIRY.

son and air. I apprehend that they are united by *solution*.

When a clear menstruum has dissolved any substance, it remains perfectly transparent. This *test* of solution is founded upon a very extensive and uniform induction of facts, determined by accurate and numerous experiments in various kinds of menstrua, saline, inflammable, watery, and aërial, without a single exception that occurs to my recollection. It may be imagined that the transparency of the solution does not depend on chemical combination, but on the natural transparency of the ingredients. But metals, earths, &c. are opaque bodies, yet, when dissolved, in their proper menstrua, the solution is perfectly transparent. On the contrary, if two transparent substances, that have no chemical attraction for each other, be agitated together, they will become opaque, as, water and oil, or air supersaturated with watery vapour. So numerous and so uniform are the

the facts on which this observation is founded, that it may justly be denominated a chemical principle, or *law* of nature.—To apply this law to our subject.

1. It is universally allowed, in this country, that the casual SMALL-POX may be propagated without immediate contact of the patient or of the poison, and that the Distemper can be communicated from the infectious to the infected person through the medium of air. Variolous matter applied to a wound, or to the inside of the nostrils,* or to the whole skin,† produces

* Mead de Variolis. Caput 5tum.

† “ Quædam observata videntur docere, cuti adherere quandoque illud Contagium, & deinde morbum producere. Vidi aliquoties, perfectâ sanitate fruentibus, unicam in cute pustulam attolli, rubere, dolere, suppurari, et cutem satis profunde exedere, cicatrice satis insigni relictâ: paucis diebus postea variolarum morbus cum omnibus suis symptomatibus sequebatur. Audivi de aliis medicis, quod et idem aliquoties observaverint; imo mulierculæ, quæ variolis decumbentium custodiam agere solent, has pustulas *Moederpokken* solent vocare, tanquam sequentium brevi variolarum genitricæ, & audacter prædicunt, secuturum morbum. Plerumque in facie, talis pustula solet apparere, ferè semper unica, raro binæ vel plures; saltem
non

the inoculated SMALL-POX. So that the casual SMALL-POX appears to be *always* communicated through the air. Hence it is proved incontestably that the Pestilential Effluvia, or *Miasms*, exist in the air near to a SMALL-POX patient, or to Variolous Matter.

Another, and no less evident a proof of the existence of Variolous Miasms in air, may be inferred from their *peculiar* smell. The impregnation of liquids may generally be distinguished by the taste. Air cannot be tasted; but smelling, the sense appropriated to that element, distinguishes the presence of Variolous Miasms, by a peculiar and offensive stench.

2. Air, though strongly impregnated with Variolous Miasms, is perfectly transparent. The sight is the most acute of our

non memini, me in praxi unquam plures quam binas vidisse, et semper fœdiorem cicitricem relinquunt quam ipsæ variolæ." Van Swieten Com. t. v. p. 27.—See also Phil. Transact, abridged, No. 375, and for 1768, xvii.

senses, and could discover a very slight degree of opacity. If a single grain of magnesia be agitated in a quart of clear water, its white particles are visible in every drop of that water. A pound of bitter cathartick salt might be dissolved in a quart of water, and, when thus combined, cannot be discerned: we may therefore reasonably conclude that it becomes invisible; for a grain of this salt added after full saturation, remains visible. Small particles floating in air are as distinguishable as particles floating in water. Again, the quantity of air applied to the organ of smell is small compared with what is pervaded by the organ of sight. It is true, that a few particles of dust, not visible in a shaded chamber, being of the same colour as the surrounding objects, may be distinctly seen by a ray of the sun admitted into the chamber. The rays of the sun render objects of every colour bright, and the dark shade behind them sets off these bright objects most distinctly.

tinctly. I have, several times, exposed the air impregnated with Variolous Miasms to a ray of the sun, let into a dark chamber, but could never observe that it was visible, not even in the most infectious state of the confluent SMALL-POX, immediately issuing from the pustules. However, I would by no means maintain, that air is never super-saturated, and consequently rendered visible, by Variolous Miasms.

3. If any salt be put into a less quantity of water than can dissolve it, after fully saturating the water, the remaining salt continues unchanged, and capable of impregnating a larger proportion of water. In like manner, when the Variolous Poison is put into a small portion of air only, it continues capable of impregnating more air, and a part of the poison remains undissolved. Thus inoculators keep Variolous Pus close corked up in small phials, that the air may not dissolve all the infection contained in it. I have seen the Variolous Pus remain,
in

in a close-corked phial, in a half fluid state, for several months, not being inclosed with a quantity of air sufficient to dissolve the moisture.

4. This theory is confirmed by a very extensive and uniform *analogy*. The perspiration of vegetables, which Dr. HALEs has proved to be very copious, and the insensible perspiration of animals, are perfectly invisible. If the effluvia are supposed to consist of such minute particles, that the eye cannot distinguish the perspiration of one man or one leaf; yet when we view, in one direct line from the eye, thousands of men, or millions of leaves, their accumulated perspiration must be distinguished, if they diminished, in the slightest degree, the transparency of the air. Not only the well-established theory, that water is soluble in air, confirms the doctrine here advanced, but, I apprehend, that the phenomena of all volatile substances, whose vapour is invisible, are manifestly

nifestly explained on the same principle. The mode of combination between the Variolous Poison and air seems *extremely analogous* to the combination of all invisible odours with air, that is, by solution. The air is rendered odoriferous without diminishing its transparency, by an infinite variety of substances, of which the Variolous Poison itself is one.

§ IV.

If TWO persons be exposed, for the first time, to the Variolous Infection, they very rarely both escape catching the SMALL-POX; and if THREE persons be exposed together, they much more rarely all remain uninfected.

If a person, who had not had the SMALL-POX, were *always* to catch the Distemper, whenever exposed to the Variolous Infection; it would follow, as an undoubted conclusion, that if such a person had not been
attacked,

attacked, he had certainly never been exposed to the Infection. But the facts are more complex, and the conclusion less obvious. Indeed, in my opinion, a want of due consideration of these facts has occasioned the most erroneous conclusions. I request the reader's particular attention to this point, as many of the following arguments principally depend upon it.

Physicians allow, I believe universally, that neither Inoculation, nor breathing the Variolous Miasms, will produce the SMALL-Pox in every person who never had the Distemper. The proportion of mankind incapable of Infection has been estimated by authors of high authority to be 1 in 20.* There is an opinion very generally prevails, which is probably well founded, that some persons are incapable of Infection at one time and yet are infected at another. I do not know a sufficient number of facts of

* Sauvages Classis iii. Genus 2dum. Rosenstein's Diseases of Children, chap. xii.

this

this kind to ascertain what proportion of mankind is liable to this temporary incapacity of receiving the Infection. It is certainly a very small proportion; indeed so small, that some, of very extensive observation, have doubted whether it exists at all. From a general recollection of the imperfect evidence produced on this subject, I should conjecture, that it does not happen once in several hundred instances; if so, the proportion above stated, of 1 in 20, will be altered a very small fraction only, by this temporary incapacity.

It occurred to me, that it might be computed arithmetically, by the doctrine of chances, according to these data, if *one*, if *two*, or if *three* persons were exposed, for the first time, to the Variolous Infection, what degree of probability there was that one or more of them would catch the Distemper. At my request, a mathematical friend made the following computations on each supposition.

‘ If

‘ If there be 1 person in 20 who is not
‘ liable to the SMALL-Pox, it is evident
‘ that, for any particular person, there are
‘ nineteen chances that he may be infected,
‘ and only one that he cannot. Hence we
‘ may reason, however epidemical the
‘ SMALL-Pox has been in a town, that a
‘ child who has escaped the Distemper, was
‘ never exposed to the Infection, (unless
‘ we know the contrary) is probable, in the
‘ degree of 19 to 1. If two in a family
‘ have escaped, the probability that they
‘ were never both exposed is above 400 to
‘ 1: if three in a family have escaped,
‘ above 8000 to 1.’*

* My ingenious friend, Mr. DAWSON, a truly mathematical genius, not unknown to some of the first philosophers of the age, favoured me with this calculation. To Dr. STEWART, Professor of Mathematicks at Edinburgh, and to Dr. HORSELEY, late Secretary to the Royal Society, he first suggested some mathematical doubts in regard both to their principles and calculations, for ascertaining the distance of the sun, by the theory of gravity. With Mr. EMERSON, he had some mathematical disquisitions, concerning the precession of the equinoxes. I had intended to subjoin Mr. DAWSON’s demonstration: but to
the

But as these calculations may not produce general conviction, there is another method, by which any person, who will take the trouble, may satisfy himself that this argument has a just and true foundation. Let twice 20 or 40 white peas be put into a box, and mark 2, or every 20th pea, with ink, and take out two at a time without seeing them. He will *very rarely* take out the two marked peas together. If thrice twenty or sixty peas be put into a box,

the mathematical reader it would be superfluous, and to others useless. To mention the data and conclusions may be sufficient. ‘ This calculation depends not only on the
 ‘ proportion of 1 in 20 naturally exempted from the
 ‘ SMALL-POX ; but likewise on the number of inhabitants
 ‘ in the place where the SMALL-POX is epidemical, who
 ‘ have never been previously exposed to the Variolous In-
 ‘ fection. This number varies greatly at different times
 ‘ and places, which produces some variation in the calcu-
 ‘ lation. For example, let this number be supposed three
 ‘ hundred and fifty. If then two in a family have both
 ‘ escaped, the probability that they were never both ex-
 ‘ posed is as 422 to 1 ; if three have escaped, as 9496 to 1.
 ‘ If the number who have never been exposed to Infection
 ‘ be infinite ; when two or three together have escaped the
 ‘ Distemper, the chances that they have not been exposed
 ‘ to the Infection are as 399 to 1, and 7999 to 1 respectively.’

if

if three of them be marked, and if three peas be taken at a time, the three marked peas will *much more rarely* be taken out together. This is obvious to common sense, and any one, who has patience to make the trial, may have actual proof.

Hence we may conclude, when three or more persons together, in the same place, and at the same time, have all escaped the SMALL-POX, that they were not exposed to the Variolous Infection.

I can add an argument which strongly confirms this calculation of chances, and may be regarded by many as more conclusive than any calculation. I have asked the following question and obtained answers from twenty-six Physicians and five Surgeons, all eminently distinguished for their medical knowledge and extensive practice. ‘ Did you ever know three or
‘ more persons, at the same time and place,
‘ all escape the SMALL-POX, after being
‘ certainly exposed, for the first time, to the
Infection,

‘ Infection, either by inoculation with genuine fresh matter, or by breathing the air of a chamber in which the variolous smell was perceptible?’ None of these gentlemen mention a single instance of three together escaping, after exposure to Infection. And I have only been informed of two instances, where two together both escaped. This observation is not applicable to young infants, who are, it is well known, less liable to catch the Distemper.*

§ V.

The period between Infection and the commencement of the Variolous Fever is generally from the 6th to the 14th day inclusive, after Inoculation: and this period is not much longer in the casual SMALL-POX.

The only proof that can be given of this proposition is by an induction of facts. A great number of cases would be required to deduce any certain conclusion. No one probably has had more experience in Ino-

* See MONRO on Inoculation, p. 25. culation

eulation than Baron DIMSDALE, to whom mankind are so highly obliged for communicating the improved method of conducting this process. In a Letter from the Baron, I was favoured with the following important observation, and have leave to mention it in his name, which, on this subject, will be allowed of the greatest authority. ‘ In the improved method of inoculating with fluid matter, the Eruptive Fever, in every instance within my experience, commenced on some day from the 6th to the 14th, both inclusive. I have not known one instance later.’*

This period, in any particular case, can be accurately ascertained in the inoculated, but with much more difficulty in the casual SMALL-POX. However, for the purpose of this inquiry, it would be useful to approach the truth as nearly as we can, in the casual Infection. I will circumstantially relate some facts to illustrate this point.

* See also the same remark in MONRO on Inoculation, p. 21.

1st Case. A daughter of the late Rev. Mr. HARWOOD's passed very near, but did not touch, a child who had the SMALL-Pox, in the *row* (a kind of covered gallery, open on one side to the air) at the bottom of Northgate-street, Chester, and sickened of the Distemper on the *eleventh* day after this Infection.

2d Case. November 21, 1780. Miss M. BENNETT, whose father is master of a ship at Liverpool, went thither from Chester, where there was only one SMALL-Pox patient, with whom she had no connection. On the night of her arrival at Liverpool, she went into a house among children who had the SMALL-Pox; some of them, whose scabs were dry but not dropt off, touched her hand. She sickened on the 3d of December, that is, on the *thirteenth* day after Infection. As there might be some suspicion that this patient was infected by her skin touching the Variolous Scabs, it may be necessary to mention that I examined her
hands

hands to see whether there was any appearance of Inoculation, but discovered none.

3d Case. A daughter of Mr. Moss, watch-maker, went on September 21st, 1780, from Frodsham, in which town and neighbourhood there was not a SMALL-POX patient, *to Liverpool, where the distemper was epidemical.* She returned to Frodsham on October the 1st, and on that day the Eruptive Fever began, that is, on the *eleventh* day from her arrival at Liverpool.

4th Case. A child was at school where another child went, with some of the Eruptions upon it, on the 21st of December; on the 31st the latter child sickened, that is, on the *eleventh* day.

Cases 5th and 6th. In November 1781, two children of Mr. BURGESS's of Helsby, who were to have been inoculated, were secretly taken by a servant to a patient in the SMALL-POX, on purpose to catch the casual Infection. The Eruptive Fever commenced, in both, on the *eleventh* day
of

of Infection.—Mr. JACKSON, surgeon, of Frodsham, can witness that the four last cases are accurately stated.

7th Case. On the 6th of November, 1777, Master H. A. met a child ill of the SMALL-POX on the walls of Chester, as will be hereafter more particularly related; his Eruptive Fever commenced November 15th, that is, on the *tenth* of Infection:—In all these cases, except the 4th, the dates were exactly ascertained to myself by the parents, at the time when they happened.

8th Case. Mr. DAWSON, of Sedbergh in Yorkshire, acquainted me, by letter, with the following fact: ‘A child was
‘ prepared for the SMALL-POX. But the
‘ mother, averse to Inoculation, carried it
‘ to an infected house, about a mile off.
‘ This was Sunday afternoon about three
‘ o’clock, and Monday the first but one
‘ after, nearly about the same hour, the
‘ child sickened;’ that is, on the *ninth*.

9th Case. The widow of the late H. V. esq; had escaped the SMALL-Pox till her 65th year. On a Saturday, she was visited by a female acquaintance, whose family had the Distemper, who lay with her that night, and returned home on the Sunday. On the Tuesday se'nnight following, Mrs. V. sickened of the SMALL-Pox, that is, on the *eleventh* day after Infection. I had this information from the family when the event was recent, and Messrs. BRODHURST and WILLIAMSON are also medical witnesses of the fact.

10th Case. On 'June 25th, 1784, Master LLOYD, thirteen years of age, went into a chamber, where there was a boy thirteen years old recovering, and another ill of the SMALL-Pox. He took notice to me, that he perceived a peculiar smell in the room. On the 9th of July, his Eruptive Fever commenced, that is, the 15th day after he was infected. This case deserves peculiar attention, as it affords a clear and decisive instance

instance that the period between Infection and the Eruptive Fever was longer in the casual, than it is in the inoculated SMALL-POX. Mr. NICHOLLS, surgeon, of Ruthin, was also witness of this fact.

To discover whether any difference could be observed in the period between Infection and the commencement of the Variolous Fever, in the casual and inoculated SMALL-POX, I compared ten cases, taken indiscriminately by Inoculation, with the ten cases above related.

Fever commenced after Infection in the

Inoculated SMALL-POX.		Casual SMALL-POX.
<i>Cases.</i>	<i>Day.</i>	<i>Cases.</i>
3	8th	0
5	9th	1
1	10th	1
1	11th	6
0	13th	1
0	15th	1
<hr/>		<hr/>
10		10

D

Hence

Hence it would seem, as far as these *few* facts bear evidence, that this period is about two days longer in the casual, than the inoculated Infection.

None of these cases prove, that there is much difference. I have had, however, authentick information of two facts, that, at first view, seem exceptions to this proposition, in regard to the casual Infection, the one being apparently longer and the other shorter than the period here mentioned. ‘ A girl of fourteen years old came
‘ from a part of the country where there
‘ was no SMALL-POX, entered a chamber,
‘ unexpectedly, where there were several
‘ patients in the Distemper, and was greatly
‘ alarmed. She was immediately struck
‘ with a pain in her back, which continued
‘ several hours. This happened on Thurs-
‘ day; she was quite well on Friday and
‘ Saturday, became feverish on Sunday, the
‘ *fourth* day from the interview, and the
‘ eruptions appeared on the Wednesday.’

Though

Though I had this information from a most intelligent and faithful observer, Mr. W. LLOYD, surgeon, of Wrexham, yet it is possible that the girl might have been previously infected, which often happens without the person's own knowledge. Besides, there is great reason to think that the period between Infection and the Eruptive Fever is not shorter, but probably somewhat longer in the casual than the inoeulated SMALL-POX; otherwise, patients who often breathe infectious air at the time of Inoeulation, would be liable to the fatal effects of the casual SMALL-POX, and the event must much more frequently prove unfortunate.

I was acquainted, by letter, with the following fact, from Dr. HUCK SAUNDERS, a physician justly celebrated for his medical knowledge and discernment. "In 1757, " the remains of SHERLEY's and PEPPE-
" RELL's regiments were embarked at New-
" York, where the SMALL-POX was, for
" Boston,

“ Boston, where the disease was not. On
“ the 20th and 21st day from their embark-
“ ation, eight men were seized with the
“ SMALL-POX.” I inquired of him, ‘ whe-
“ ther some shirt, handkerchief, cloth, &c.
“ bedaubed with variolous matter, might
“ not possibly have been taken on board a
“ transport unwashed, so as to infect the
“ soldiers after their departure; and whe-
“ ther the eight infected soldiers were in
“ the same quarters on shore, or sailed in
“ the same transport. If they were in se-
“ parate quarters, and the same transport,
“ it would increase the probability of their
“ being infected after embarkation.’ I re-
ceived the following answer. “ I do not
“ know whether the soldiers were quartered
“ in the same house, whether they belonged
“ to the same company, nor whether they
“ sailed in the same ship, or how their linen
“ was washed.” Hence I infer, that though
this fact is curious, it affords no posi-
tive proof that the infectious period was
longer

longer than above stated. Some variolous matter might possibly have been conveyed aboard the transports, and infected the soldiers, *after* their embarkation.

As I could not obtain a competent number of facts, where the hour or day of Infection was exactly known, I have attempted to determine this point by the following method. I requested Mr. OWENS, inspector to the Society, to note down, in his register of the SMALL-POX, the day of the month, when each child of the family first complained of the Eruptive Fever. The accuracy of the register I can confirm, in many instances, from my own knowledge. As opportunity offered, I collected other facts from information equally authentic. In that part of the register, which will be inserted in the ixth proposition of this INQUIRY, the 7th family is noted down in this manner, column IIIId. $\left\{ \begin{array}{l} \text{1st May 30} \\ \text{2d June 14} \end{array} \right.$ which signifies that the second child was attacked

attacked on the 16th day after the first, in that family, reckoning inclusively. The following arrangement of facts comprehends thirty-seven cases which first occurred, and marks the day when the Variolous Fever began, after the first in a family was attacked.

Day.	Patients.	Day.	Patients.
3d	1	15th	6
7th	1	16th	5
8th	1	18th	7
11th	4	21st	1
12th	2	22d	2
13th	3	23d	1
14th	3		—37

In order to deduce a proper conclusion from these facts, it will be necessary to determine how soon after the commencement of the Eruptive Fever the patient becomes infectious to others in the same family. In the proof of the next proposition, it will appear probable, that bed-fellows, in some instances, do not receive the Infection till the 6th day of the Fever, or later. Taking
this

this point for granted, it follows, that thirty-three out of the thirty-seven cases, in this Table, afford no proof that Infection preceded the Eruptive Fever longer than the 12th day.

In regard to the four cases, whose Eruptive Fever commenced on the 21st, 22d, and 23d days, it does not seem improbable that among such a number as thirty-seven, so few as four might escape Infection till the 7th, 8th, and 9th days, the period when the Distemper becomes most infectious. There is the following reason to believe that it was actually so in the patient who was seized the 21st; this was in a family where there were four children who had never been exposed to the Infection. When the eruption appeared on the first patient, which was on the 4th day of the disease, the other three were separated from it; two of them went out of the house on the 6th day, not infected; the 4th was kept separate till the 11th day, and was seized on
the

the 11th day after the latter interview with the patient, that is, on the 21st day after the first patient was attacked.—It is proper to explain that all these cases, except the single instance above related, were taken from the poorest families, among whom the intercourse was very intimate, living in the same room, and generally lying in the same bed, and not kept at a distance, by any fear either of their parents or themselves.

Many other cases, to the same purpose, have occurred to me, which I have not arranged in the Table, as these may give presumptive evidence in support of the proposition; but it is incapable of absolute proof by any number of facts that I could produce.

I have received information of several well-authenticated facts where inoculated patients have not become feverish till several days after the 14th, though I believe they were not inoculated with ‘fluid matter.’

The two following cases appear not only curious, but instructive. Where the con-

nection is the closest possible, that is, between a mother and the child in her womb; they shew at what distance of time after the mother is attacked, the Distemper begins in the child.

‘ Fæmina septimo gestationis mense variolis malignis correpta est. Filium, nullis morbi notis in corpore se prodentibus, die undecimo enixa, decimo quarto e vitâ decessit. Infans autem, cum quatuor dies postea vixerat manè convulsionibus morbi prænunciis, correptus, vesperi protrusis variolis, interiit. Liquet hic, perfecta die undecimo, ut fieri solet, aliquanta suppuratione morbum maternum in fœtum transiisse, diebus octo elapsis, in tenero corpore renasciturum.’* Hence the child was attacked by the SMALL-POX on the 18th day after his mother. This case of the celebrated Dr. MEAD, which, he says, that he had *lately seen*, is confirmed by one who is not a less judicious and accurate observer, JOHN HUNTER, esq; F.R.S. In

* MEAD de Variolis, p. 65.

the

the Philosophical Transactions,† he relates the case of Mrs. FORD, whose SMALL-POX appeared on the evening of the 8th of December. She was delivered on the 31st, that is, on the 24th day from the eruption. The child had pustules filled with matter, when born, which appeared about the 6th or 7th day of the eruption. Hence the eruption in the child must have happened on the 18th or 19th day after the mother's.

If it be granted, that Infection does not precede the Eruptive Fever longer than the 14th or 16th day, it follows, in both these cases, (1st) that the child was not infected at the time when the mother was infected, (2d) nor during the mother's Eruptive Fever. It seems probable that the children were infected after the variolous serum or pus had been formed in the pustules, and had returned into the blood by absorption.

There is an opinion so utterly groundless, that it would not deserve notice, if it did not too generally and fatally prevail, so as

to produce the mischief it is intended to prevent. It is imagined, that *change of air*, even from an infectious to a healthy situation, occasions the disease. As there cannot possibly be any just foundation for this suspicion, we may inquire what false reasoning has given rise to so absurd a notion. Between the time of Infection, and the commencement of the disease, there is an interval of several days: during this interval, infected persons may have removed, from the neighbourhood of the SMALL-POX, to a distance from it, and, soon after the removal, may have been seized with the Distemper. But it cannot be doubted that the infection would as certainly have had this effect, if the patient had remained in the former situation.

§ VI.

Persons liable to the SMALL-POX are infected by breathing the air, impregnated with Variolous Miasms: Either (I) very near a patient in the Distemper, from about the time that the eruption has completely appeared till the last scab has dropt off the body; or (II) very near the variolous poison, in a recent state or (III) that has been close shut up, ever since it was recent.

I. As no medical man, in this country, doubts that a patient in the SMALL-POX communicates an infectious quality to the air that surrounds him, we need only inquire, at what time of the disease, this pestilential emanation from his body begins and ceases.

1. I have not been able to obtain a sufficient number of facts, to ascertain, with precision, on what day of the disease a patient becomes infectious. But the following evidence will warrant a probable conjecture,

jecture, that, before the eruption appears, the patient is seldom or never liable to communicate the Distemper.

1st and 2d Cases. I attended a little boy in the SMALL-POX, whose eruptions, which were of the distinct kind, appeared on the 4th day of the Fever: his two sisters, on their appearance, were removed out of the house. One of them became feverish on the 11th day after her removal; but the other was not attacked till seven weeks after, and from another exposure to Infection. As the former sister was only removed to a neighbouring house, there may be some doubt whether she might not be infected by some future communication; the other was sent to a much greater distance.

3d and 4th Cases. A gentleman's child became feverish on the Sunday; two others of his children were daily in the same room, and one of them lay every night with the patient till Friday (the 6th day;) they were then removed; yet neither were infected, though

though the pustules had appeared a day or two before: one of them was inoculated soon after, and had the Distemper.

5th, 6th, and 7th Cases. The fact related, p. 39, to prove another point, may be adduced in evidence again, on the present subject. ‘In a family where there
‘ were four children who had never been
‘ exposed to the Infection, when the eruption appeared on the first patient, which
‘ was on the 4th day of the disease, the
‘ other three were separated from it, and
‘ escaped Infection.’

But, as I confess that the cases which have come under my own observation are manifestly too few to discover the truth, I am happy to add the testimony of my most intelligent and venerable friend Dr. HEBERDEN, in confirmation of what I had advanced. In a correspondence, with which he has long honoured me, he communicated the following observation, which I have leave to mention on his authority.

‘ Many

‘ Many instances have occurred to me,
 ‘ which shew, that one who never had the
 ‘ SMALL-POX might safely associate, and
 ‘ even lie in the same bed, with a variolous
 ‘ patient, for the two or three first days of
 ‘ eruption, without receiving the Infection.’

By comparing this observation with the facts contained in the Table, (p. 38) it appears, that when one person is accidentally seized with the SMALL-POX in a family where others are liable to it, the rest may generally avoid the casual Infection, either by separation or immediate Inoculation.

Maturation appears to be the season, when the Variolous Miasms are emitted most copiously; the poisonous pus being exposed, at that period, naked to the air, according to the accurate description of the faithful SYDENHAM. ‘ Usque ad hunc
 ‘ diem’ octavum a primo insultu ‘ pustulæ,
 ‘ quæ faciem obsederant, læves ad tactum
 ‘ fuere atque rubræ, jam verò asperiores
 ‘ evadunt, (quod quidem primum est inci-
 ‘ pientis,

‘ pientis maturationis indicium) et subal-
 ‘ bidæ, paulatim insuper *succum* quendam
 ‘ luteum, colore a favo non abludentem,
 ‘ *evomunt.*’*

2. It is also of great importance to ascertain, at what time a patient ceases to be infectious. As long as a variolous scab remains, it undoubtedly contains the poison in a concentrated form. After all the scabs have dropt off, I should conjecture that no infectious quality could be suspected to remain in the body, there being such a quick discharge of every thing offensive to the constitution by the numerous excretions. This conjecture has been confirmed by the uniform experience of the SMALL-POX Society. The skin, hair, &c. may, however, have variolous matter adhering to them, unless they are sufficiently cleaned.

In an Inquiry how to prevent the SMALL-POX, it is a point of consequence to determine, *how long the Variolous Poison remains on a patient's body.* I have collected some

* Syd. Opera, p. 134.

authentick

authentiek facts on this subject, chiefly from the register of the SMALL-POX Society. Out of ninety *single* patients, the shortest continuance of the poison was to the 10th, and the longest to the 40th day, from the commencement of the Variolous eruption, till the last scab dropt off, and, of these, only sixteen were later than the 28th day.

In a *family*, where *two* patients are liable to the SMALL-POX, one catching the Distemper from the other; out of thirty-one cases, the shortest duration of the poison was till the 18th, and the longest till the 53d day after the eruptions appeared on the first: and, of these, only two were later than the 43d day.

In a *family*, where *three* patients were to have the SMALL-POX; out of seven instances, the shortest was the 23d, and the longest the 63d day.

These facts shew for what length of time a family, in the casual SMALL-POX, continues infectious; when, by their unreserved
E intercourse,

intereourse, the Distemper is eommuni-
eated, as soon as it beeomes infectious.—
Indeed, I suspect that there ought to be a
eonsiderable abatement of this period, in
several instanees. When the *variolous* seab
is torn off sooner than it would naturally
drop, another seab succeeds, which proba-
bly contains no variolous poison: but I be-
lieve the time above noted is when the
laßt of the latter seab dropt off.

That the serum, pus, and seab of the pus-
tules of the SMALL-POX are infectious, is
universally allowed. That the breath and
insensible perspiration of a patient are in-
fectious, nobody disputes. Are the breath
and perspiration impregnated with the poi-
son from the pustules which arise in the
mouth, and on the surface of the skin?
Neither the breath nor the perspiration
seem to be infectious till the pustules ap-
pear, as was before rendered probable, (see
above, p. 44—47.) What other fluids that
are contained in, or discharged from, the
body,

body, may be deemed poisonous, is a question that, I believe, has never been considered, much less determined, though capable of determination; at present, the observations that have been made, are too few and too vague to form a probable conjecture. The saliva is most suspicious; and, indeed, little doubt can be entertained of its infectious quality, especially in the salivation produced by the confluent SMALL-POX. It may, however, be doubted, how far this infectious quality is occasioned by the variolous poison which issues from the pustules in the patient's mouth. The two cases related in the proof of the last proposition, where infants in the mother's womb were not infected, till the time of the disease when the variolous poison is absorbed from the pustules into the blood, seem to warrant a doubt whether the patient's blood becomes infectious otherwise than by this poisonous admixture.

However,

However, all the discharges of a SMALL-Pox patient, either of themselves, or from the probable mixture of the serum, pus, or scab, may be infectious; and ought to be destroyed by cleanliness, in order to prevent the propagation of the Distemper.

If these observations be well founded, some important conclusions may be deduced from them. During the Eruptive Fever, there will be no danger of spreading the Distemper, by permitting the patient to go into the open air; but, after complete eruption, when maturation begins, due care must be taken to prevent any communication with those who are liable to Infection. These circumstances happen fortunately for the patient. The late practice of Inoculation has evinced, that exposure to fresh air during the Eruptive Fever is of important service. In the disease from Inoculation, and the milder kind of casual SMALL-Pox, as soon as the eruption is completed, all apprehension of danger to the patient generally

nerally ceases. But should the number or kind of pustules, or the remaining symptoms, require any farther exposure to the fresh air, it ought to be done in some unfrequented place, or, when that is impracticable, by opening the door and windows of the patient's chamber. At least, it is certain, when the second Fever is over, that the open air is in no respect necessary towards a perfect recovery, all danger ceasing at that period of the disease. Yet, at this time, while patients remain in a most infectious state, they at present have the most unreserved intercourse with children liable to the Distemper, and become wantonly destructive to their fellow-creatures.

II. That ‘ persons liable to the SMALL-POX are infected by breathing the air, very near the variolous poison in a recent state,’ is a medical opinion so well established as to require no proof.* Let us

* See this point fully discussed in the French translation of this INQUIRY, by Dr. DE LA ROCHE, of Paris. At my request he added a *Postscript*, p. 210, which I have inserted

reflect how widely and fatally this poison is dispersed among all ranks of people. It may be conveyed into any house, unobserved, from a great variety of families, adhering to clothes, food, furniture, &c. as,

Clothes. 1. Linen. 2. Cotton. 3. Woollen, particularly flannel. 4. Silk. 5. Millinery goods. 6. Stockings. 7. Stays. 8. Gloves. 9. Shoes.

Food. 10. Bread. 11. Cakes. 12. Huxtery. 13. Fruit. 14. Butter. 15. Milk. 16. Sugar, and other groceries. 17. Salt. 18. Tea. 19. Nuts.—N. B. Food, boiled or roasted at home, is probably not infectious.

Furniture, &c. 20. Earthenware. 21. Hardware. 22. Dolls, and other toys. 23. Pens. 24. Paper. 25. Books. 26. Letters. 27. Money.—28. Medicines.

Ten fold more articles might be enumerated. Besides several of these I have men-

serted in my *SKETCH of a Plan to exterminate the SMALL-POX*, p. 95—100.

tioned,

tioned, as, linen, &c. include four families each, who, by this means, may communicate the Distemper, namely, the seller, maker, washer, and wearer.

So minute a detail of self-evident causes may be thought superfluous. But I would rather expose myself to this censure, than leave a single doubt in the reader's mind concerning the numerous means by which this fatal poison is so generally and so carelessly dispersed among mankind.

The clothes of a patient generally contain the largest quantity of variolous poison. However, all the enumerated articles, and many more, which come out of an infectious house, or from an infectious person, find their way unsuspected into families of all ranks.

The poison is quickly and universally dispersed among the lowest class of people, whose poverty renders them dirty.

It should be remarked, that children, who are most liable to the SMALL-Pox in
all

all other respects, generally put every new thing that they can lay hold of to their mouths, and are taken into the arms of many in a family, so as to expose themselves to Infection from their clothes. These considerations point out numerous and indubitable means of propagating the Distemper. Indeed, the causes of this kind are so various, that one would expect the disease to spread much more rapidly than it does in fact: an event not to be accounted for, but by supposing, what is confirmed by other circumstances, that the atmosphere quickly dissolves the Contagion, and renders it harmless by dilution, as hereafter explained.

III. That ‘ the variolous poison, which
‘ has been close shut up, ever since it was
‘ recent,’ long retains an infectious quality,
is proved by the most authentick evidenee.
This truth is clearly demonstrated by the
well-known practice of Inoculators, who
keep variolous matter in close corked phials,
for

for many months, without losing its infectious quality. In China, the Inoculators take the skins of the dried pustules, which are fallen from the body, and put them into a porcelain bottle, stopping the mouth of it very close with wax, by which method of preservation, the Contagion is said to be retained for some years. Indeed, these scabs seem particularly well adapted to retain the variolous poison. Their moisture has been gently evaporated by the heat of the body. In this dry state, they are not likely to undergo any change by putrefaction, or other kind of fermentation.

‘ About 1718, a ship, from the East-Indies, arrived at the Cape of Good-Hope: in the voyage, three children had been sick of the SMALL-Pox: the *foul linen* about them was *put into a trunk and locked up*. At the ship’s landing, this was taken out, and given to some of the natives to be washed: upon handling the linen, they were seized with the SMALL-Pox, which
‘ spread

‘ spread into the country for many miles,
‘ and made such a desolation that it was
‘ almost depopulated.’*

From a variety of considerations, I am inclined to believe that the most usual method of transferring the SMALL-POX to a distant place is, by sending to relations and acquaintance, clothes, &c. bedaubed with the variolous poison, either shut up in boxes, or, what has a similar effect, folded up in clothes, paper, &c. so as to exclude all access of fresh air. It has been remarked, that relations, living at a distance from each other, are infected by this Distemper nearly about the same time. This event, I believe, often happens, from a communication of dirty clothes, &c. and sometimes possibly from a letter. Whoever considers that the paper on which a letter is written, may have lain on the bed, where there is a SMALL-POX patient, or on a table, chair, &c. on which foul handkerchiefs, cloths, &c. are thrown, or may be
* See MEAD on the Plague, p. 1. ch. ii. besmeared

besmeared with variolous matter, by the unwashed hands of a servant, a correspondent, or patient; that the letter is folded up carefully, so as to exclude the air; that, when opened, it is held near the mouth and nose to be read; and afterwards a child puts it into the mouth; will not be surprised that it may sometimes communicate the Infection. ‘Hujus rei sat probabile exemplum reperire mihi visus sum, quum nullæ omnino, ante aliquot annos, hic loci notarentur variolæ. Puella *litteras* aliunde a fratre suo, qui morbo isto ibi tunc epidemio laborabat, acceptas gestarat secum, per aliquot dies: et en! nil metuens aut cogitans, subito eadem lucæ cepit affligi, contagiumque deinde cum cæteris contubernaliis quatuor communicavit, unde id in aliam quoque domum translatum est, eamque pervagatum cessavit.’*

That the causes above assigned for the propagation of the SMALL-POX are *true*, no medical man will doubt; namely, the

* WERLHOFFII Opera, p. 487. — ncar

near approach of a patient, or of the variolous serum, pus, or scab, by any person susceptible of Infection.

That these causes are *sufficient* to account for the Distemper, in all cases, will not appear improbable, to any one who duly considers the innumerable methods by which this poison is dispersed among mankind.

However, two objections will very generally be made to this conclusion, which shall be particularly considered in the two following propositions.

§ VII.

Clothes, furniture, food, &c. exposed to the Variolous Miasms, never, or very rarely, become infectious.

That Variolous Miasms may be retained in clothes, furniture, chambers, food, &c. so as to communicate an infectious quality to the neighbouring air, is the generally prevailing opinion, nor do I know that it has ever been disputed.* But if we exa-

* See the Introduction, p. 4.

mine this point with attention, I trust it will appear, that it is an opinion, nearly, if not entirely, groundless. This conclusion may be deduced from the simplest and best-established principles of chemistry. It has been proved that the variolous poison is united to the air by *solution* (sec § III.) Chemical attraction is the cause of solution, as appears from the clear evidence of innumerable experiments. Chemists have employed much labour and ingenuity to ascertain the various degrees of this attraction, between almost all the different substances that nature presents to their examination. The degree of attraction between the same substances, in the same circumstances, is always uniformly equal. Now whether it be supposed that air attracts the variolous miasms more strongly than clothes, &c. do, or that clothes, &c. attract the miasms more strongly than the air does, the argument will be conclusive against this opinion. For if air attract the miasms more strongly than clothes,

clothes, &c. do, it is evident that the miasms could never be taken from the air in order to adhere to the clothes, &c. On the contrary, if clothes, &c. attract the miasms more strongly than air does, it follows that such miasms could never be taken from them by the air, and consequently they could never render it infectious.

It may not be improper to take notice of some facts, which, to an inaccurate observer, may seem exceptions to the chemical principle on which this argument is founded. Clothes, it is well known, after being exposed, in a chamber, to the smoke of tobacco, will communicate these effluvia to fresh air, as is manifest to the smell. In a chamber where much tobacco has been smoked, a part only of the smoke is *dissolved* in the air; and the rest floats about in a visible form, being in a state of *diffusion*. In this case, the fact seems to be, that tobacco smoke adhering to the clothes is afterwards dissolved by the air. The circumstances

stances of the effluvia of tobacco and the variolous miasms are essentially different. The smoke attracted by clothes is not dissolved in the air, but diffused in a visible form, in which state it has no chemical combination with air. Whereas the variolous miasms are perfectly dissolved in the air, and consequently could not combine themselves with the clothes, unless they had a stronger attraction to the clothes than to the air; in which case, they would remain in combination with the clothes. Besides, it seems evident that the smoke of tobacco is not all soluble in air. This, like all other substances whose inflammability depends on oil, probably leaves an indissoluble foot. The pipe, and the walls, ceiling, &c. of a room where there has been much tobacco smoked, soon acquire a dark colour, probably from the soot which remains undissolved. A part of this soot may stick to the clothes, and continue to emit soluble effluvia. That the air dissolves
a considerable

a considerable proportion of tobacco smoke is evident; a chamber often smells strongly of tobacco, though no smoke is visible. In such a chamber, do clothes acquire the smell of tobacco? I have received the following information from a very accurate and intelligent observer. ‘ In travelling, ‘ I have often breakfasted in a room of an ‘ inn, where company has smoked the ‘ night before; and, after returning to my ‘ chaise, have perceived my clothes smelling of tobacco.’ In this case, might not some smoke remain in a diffused state? a ray of sun-shine discovers smoke not visible in the shade, as I have often observed. Or, did some soot stick to the traveller’s clothes by touching a table, chair, &c.?

Another apparent exception to the principle may be suggested by the following fact. Woollen clothes become damp in a moist air, and lose their dampness in a dry . air, that is, in the first case, the watery particles, which are *diffused* in the supersaturated

turated atmosphere adhere to the clothes, and in the last, the dry air *dissolves* the water retained by them.

Clothes exposed to the offensive stench of a privy, generally retain no smell. However, I have been informed, on good authority, that some privies impart a disagreeable smell to clothes. May not this fact be explained on the principles here advanced? If the air of the place be supersaturated with this noisome vapour, the effluvia, in a diffused state, may be attracted and retained by clothes, till carried into fresh air where it may be dissolved. To confirm this explanation, it is well known that this vapour is sometimes visible; and clothes acquire this smell in those privies only whose stench is peculiarly offensive; and wood, &c. exposed for some time, to such effluvia, acquire a dirty covering.

There is an observation, in the late Mr. HOWARD's state of prisons, that may be thought to argue against the doctrine here

advanced. ‘My clothes were,’ he says, ‘in my *first* journies, so offensive, that, in a post-chaise, I could not bear the windows drawn up; and was therefore often obliged to travel on horseback. The leaves of my memorandum-book were often so tainted, that I could not use it till after spreading it an hour or two before the fire: and even my antidote, a phial of vinegar, has, after using it in a few prisons, become intolerably disagreeable.’* In this case, I suspect that the air of the prison was *supersaturated* with noxious effluvia. He particularly distinguishes in italicks the ‘*first*’ journey. Though his benevolent remarks had effected reformation before his second visits, yet it cannot be supposed that such noxious effluvia were totally destroyed; but only that the quantity was so diminished as not to supersaturate the atmosphere. It might be difficult to determine this point by the test of trans-

* HOWARD’S State of Prisons, 2d ed. p. 8.

parency, as it is probable that not a single ray of cheerful sun-shine ever did or could penetrate into those gloomy mansions.

If this idea be well founded, it should suggest a caution to keep the chamber, where there are patients in the SMALL-Pox, well ventilated, in order to prevent the Variolous Miasms from communicating, by supersaturation, an infectious quality to clothes; and, fortunately, it is well known that fresh air is extremely salutary, and peculiarly conducive to the recovery of persons ill of this Distemper.

On this subject, the scenting of clothes, &c. by the effluvia of musk, obviously suggests itself. The vapour of musk is uncommonly penetrating and permanent, in a manner difficult to be explained, and, I believe, different from any other. It seems to be an exception to the general analogy of nature, which produces infinite variety of odours that are not suspected to communicate any scent to clothes.

Dr.

Dr. LIND, in his excellent papers on Fevers and Infection, has detected, in a masterly and philosophical manner, the contagious nature of various Fevers not before suspected to have that pestilential quality. His remarks, if properly attended to, might be of great importance to mankind, especially to this nation, by preserving the lives of our brave seamen. He has shewn, that cleanliness and fresh air will not in all cases destroy this poison, that it is retained in the beams of wood, of ships in the service, and in the decayed timbers of old hulks (p. 39, 42.) But I apprehend that this observation is in no respect applicable to the Variolous Miasms, a poison *sui generis*, never known or suspected to be spontaneously generated since its original production. Whereas it seems probable that these Pestilential Fevers may be generated by human effluvia, in close apartments, occasioned perhaps by some particular modification of the putrefactive process. In
old

old hulks, the decayed timbers, and, in other ships, the beams of wood in a decaying state, may naturally be suspected to exhale a poisonous vapour. The fumes of burning brimstone seem well adapted to check this kind of putrefaction. But we know too little of the nature of the variolous poison to investigate its antidote.—*Dilution*, however, is a certain and practicable corrector of it.

On the whole, it is difficult to imagine how Miasms adhering to clothes should convey Infection. The quantity of air impregnated with Variolous Miasms contained in the interstices of clothes is so extremely minute, and by passing through fresh air, would be so quickly diminished, that a sufficient quantity to do mischief cannot be reasonably supposed to remain at even a small distance from an infectious chamber. The only clothes that seem capable of conveying Variolous Miasms from one chamber to another, are gloves or boots, if they

they be pulled off in air strongly impregnated with this poison, and so stiff as not to collapse, and a person liable to the SMALL-Pox should purposely inspire all the air they contain. The hollow furniture of a patient's chamber, as, boxes, drawers, &c. are less suspected, but more dangerous means than clothes, of containing Infection. They inclose a considerable quantity of air impregnated with Variolous Miasms, which, if shut up, might long remain there.

Another less obvious means of communicating Infection seems not improbable. If a bottle, full of any fluid, be emptied in a SMALL-Pox chamber, especially near a patient, as often happens, it would be immediately filled with infectious air, which might retain its poisonous quality for any distance of time or place, as, in that situation, it seems unlikely that any fermentation could change this quality. But the infectious air might easily and certainly be removed by filling the bottle again with any
liquid.

liquid.—However, I confess, that these are merely theoretical conjectures, which I cannot confirm by facts.

So much for theory and analogy. Let us next inquire if it can be determined, by actual observation, whether Variolous Miasms adhering to clothes, &c. spread the SMALL-POX. It has often been observed, that Infection was caught from a person who had visited a patient in the Distemper. So many instances of this kind are mentioned, and on such good authority, that the fact cannot fairly be disputed. The common explanation of this mode of spreading the SMALL-POX is to suppose that the Variolous Miasms adhering to clothes convey the Infection. But, if this were the cause, the Infection must be much more frequently communicated by visitors: because the clothes of *every* visitor, in an infectious chamber, must be exposed to the Variolous Miasms. On the contrary, we have innumerable proofs that clothes, &c.
exposed

exposed to the Miasms of a SMALL-POX chamber, and soon after approaching persons liable to the Distemper, do not *always* nor *generally* communicate Infection. Cases of this kind occur so very frequently, that it seems unnecessary to relate particular facts: I could, if required, produce numerous proofs to establish this point. Inoculators particularly have their clothes, &c. daily exposed to Variolous Miasms, yet they do not convey the casual SMALL-POX to others liable to it, though during the time of preparation they approach very near them, for days and weeks previous to Inoculation. We know *certainly* that recent variolous matter conveyed near to a person capable of having the Distemper is generally infectious: if it approach *three* within the infectious distance, it is probable that one of them will be attacked, in the proportion of several thousands to one, (see p. 24.) Now a person, who has been in a SMALL-POX chamber, may inadvertently

vertently convey the variolous matter either adhering to his clothes, hands, feet, &c. These considerations shew, to a high degree of probability, that the SMALL-POX is always conveyed out of one house into another, not by Miasms adhering to clothes, but by variolous serum, pus, or scabs.—A caution may hence be suggested to medical and other visitors, never to sit down in the chamber of a SMALL-POX patient.

A Physician,* justly celebrated for his professional knowledge, who honoured these papers with a perusal in manuscript, makes the following remark, on this point, in answer to the 2d *Query* annexed to the INQUIRY. ‘Do the rules of prevention comprehend every necessary restriction?’

‘A. to Qu. 2. If the theory be true, that Contagion cannot be carried out of an infected house by variolous *effluvia* absorbed in clothes, &c. of medical attendants, &c. no necessary restriction seems to be omitted. But I know many, whom

* SIR GEORGE BAKER.

‘ no arguments will convince, that the
‘ SMALL-POX was not brought into their
‘ families by Surgeons, Apothecaries, &c.’

To this objection, I reply, that medical attendants, it is well known, carry various matter in their pockets for the purpose of Inoculation, sometimes perhaps not sufficiently closed from the external air; and it may also, now and then, accidentally stick to their clothes, hands, feet, &c.

It is of much greater importance than it may seem, to a superficial observer, to ascertain whether the Variolous Miasms are absorbed by clothes, &c. so as to become infectious. If this were the case, no person could possibly go into an infected chamber, either on duty or by accident, but his clothes and every thing around him would inevitably be rendered pestilential. Nothing less than a total separation of patients in the SMALL-POX, and all their attendants, from those who are liable to the Distemper, would be a sufficient security from Infection.

tion. To effect this, regulations would be required that are absolutely impracticable in this free country. It may be imagined that a pest-house would answer the purpose. It has in fact been successfully used for this end in remote small towns, where the SMALL-POX rarely occurs, where it infects but a few, and those generally grown persons. But in large towns, where the Distemper is constantly present, almost all the poor natives are infected while children. If an infant be attacked, and carried to the pest-house, the feelings of a mother would not suffer it to go alone, even in the most arbitrary government. If she have other small children, they would perish at home without her assistance, and must therefore go into the pest-house along with her. Unsurmountable embarrassment would arise, if we suppose only *ten* such families to be admitted at the same time.

Let us farther consider some of the innumerable difficulties of preventing the propagation

propagation of the SMALL-POX, if clothes exposed to the Variolous Miasms were rendered infectious. The *whole* external surface of the clothes and person of *every* visitor must be *always* contaminated, on returning out of the sick chamber, and would convey the Distemper to all liable to it, who soon approach them after such contamination. It is not pretended that this pestilential quality can be discerned by any of our senses. The Miasms adhering to clothes cannot be seen nor even smelt, that I ever heard of. No practicable restrictions could possibly be devised, much less executed, to prevent such secret, subtle, and unsuspecting danger. Under a general conviction of these supposed difficulties, the point is given up in despair. No attempt is made to destroy the poison. It is allowed to be carelessly scattered among mankind, though the well-known cause of a mortal malady; because, according to the opinion which has long and universally prevailed, other means, utterly

utterly beyond our power to prevent, are equally capable of producing the mischief.

But I argue, that the variolous poison in the form of serum, pus, and scab, by impregnating the air near it, is the sole means of Infection. If this opinion be well founded, the difficulty of prevention is less, beyond all comparison, than on the former supposition. The poison, in this form, may be seen and easily destroyed. One visitor in 50, or 60, may possibly convey, out of an infectious room, some of the variolous matter capable of doing mischief. It may accidentally adhere to some *part* of his clothes or person. But cleanliness alone, which the instinct of nature suggests, and social habits improve, would be fully sufficient to prevent the communication of Infection, except by personal intercourse with the patient. If this conclusion be admitted, may not the variolous poison be prevented from injuring mankind, with as much ease and certainty as arsenick, laurel, or any other poison?

§ VIII. *The*

§ VIII.

The Air is rendered infectious, but to a little distance from the Variolous Poison.

When the SMALL-POX becomes epide-
mical at any season, it is thought by many
to *infect the air of the place*, to a consider-
able distance.* And as this quality of the
air is supposed to be far above human
power, or wisdom, either to avoid or cor-
rect, the danger is acquiesced in as inevi-
table. This opinion merits attentive con-
sideration, as, I apprehend, that it suggests
fear where there is perfect safety, and pre-
vents caution where there is the greatest
danger.

I will state the *train of argument*, which
first suggested doubts concerning the truth
of this opinion, and afterwards the *facts*,
which seem to prove that the opinion is
utterly false.

In the chamber of a patient who has the
malignant SMALL-POX, it is well known

* See the Introduction, p. v. vi. that

that the Variolous Miasms occasion a most offensive smell, and to a much greater degree *near the patient*, than at a distance, even in the same room; though, as far as I have observed, the Miasms are invisible where the air is most saturated. This fact seems to prove, that the whole air contained in the chamber of a patient is seldom or never saturated with the variolous poison, much less supersaturated. Consequently, when the infectious Miasms, dissolved in a certain portion of air, are *diluted* with fresh air, the strength of the poison is inversely as the quantity of air. The infectious air that issues out of a chamber, which contains a SMALL-POX patient, by the doors, windows, and crevices, is a small quantity compared with what is contained in the chamber, and least saturated with the poison. But suppose the infected air contained in a *whole chamber* were to be mixt with the external air, *dilution* would probably soon render it harmless. The poison

son would be diluted with several hundred times more air, at the distance of a few yards, than in the patient's room. Suppose a chamber to be ten feet in each dimension, it would contain one thousand cubical feet of air. A body of air, including the chamber and forty-five feet on each side of it, would be one million cubical feet. But, if the chamber be on the ground-floor, near one half of the cube must be subtracted, there being, in that case, no air in a perpendicular direction from the patient downwards; there will therefore remain five hundred thousand cubical feet. Hence the degree of dilution will be more than five hundred times greater at the distance of forty-five feet, than in the patient's chamber.

The force of this reasoning will be best understood by reflecting, what a wonderful effect *dilution* produces upon the most virulent poisons. Thus, a single drop of caustick fixed alkali will corrode a hole in
a person's

a person's clothes or skin; yet, when diluted with a small proportion of water, it becomes a safe and wholesome remedy. There is an illustration still more apposite to the present subject. Pure fixed air breathed into the lungs is one of the most instantaneous and deadly poisons known: yet fixed air, diluted with a small proportion of atmospheric air, becomes not only safe, but, in some cases, salutary. These considerations seem to shew the improbability of the open air being infectious, even at a small distance from a sick chamber. In the same house, doors and passages may give a particular direction to the poison, so as to convey its influence to a greater distance. I know but one cause that can be likely to disperse the Infection farther from the patient's chamber than as above estimated, that is, a strong wind. But, to have this effect, the wind should blow directly through the chamber, an uncommon circumstance; and, even in that case, the Miasms would,

by agitation, be soon mixed with a large proportion of atmospherical air. In general, when the wind blows from an infectious house, there is at most a door or a window open, and consequently not more than perhaps a tenth of the infectious air contained in the sick chamber may be mixed with the surrounding atmosphere in ten minutes, during which time, a part of the poison would be blown to a great distance.

To diminish the force of this argument, it may be suggested, that the Variolous Infection is a ferment, of which a few particles mixed with the blood might occasion the generation of a large quantity of poison. It cannot be denied, that, by Inoculation, a very small portion of matter, and, we may even allow, that by casual Infection, perhaps a much smaller quantity of Miasms, dissolved in the air of a SMALL-POX chamber, can produce, in some subjects, so much variolous poison as would communicate the Distemper to thousands. But when the
infectious

infectious air is again diluted, several hundred times, with fresh air, we cannot suppose it to retain any mischievous energy. A fact respecting another kind of ferment sets this point in a true light. A pint of yeast is sufficient to excite a fermentation in a barrel of ale, but 100th, much less 1000th, part of this quantity of yeast would not have the effect.

These *theoretical* considerations shew, to some degree of probability, that the infectious atmosphere has some limit, and that limit not far remote from the variolous poison; but they cannot determine, with any exactness, to what distance the infectious quality extends. However, they suggested the observation of the following facts, which approach nearer to an investigation of this important question.

The intelligent reader will remark, that each fact here stated is a separate proof of the doctrine above advanced. The **SMALL-POX** was epidemical in Chester from May

1777 till January 1778, that is, for nine months, particularly for the last six; during which time I attentively marked its progress. 1. At the beginning, two or three families were seized, not immediate neighbours, but in the same quarter of the town. 2. Then the children of a neighbourhood, comprehending an Entry, had the Distemper, but it did not spread from them as a centre. 3. In no part of the town it has spread uniformly from a centre, farther than through an Entry or a narrow lane, where all the children of a neighbourhood play together. 4. Afterwards the poor children in several parts of the town were attacked, at a considerable distance, in some places half a mile, off each other. 5. Yet many portions of all the large streets were not infected in November, but so late as December and January the Distemper returned to attack many who had escaped, when it was in their neighbourhood some months before. 6. In Hanbridge, a part
of

of Chester, only separated from the rest of the town by the river Dee, not more than about seven had been infected during the epidemick, though great numbers of children, in this quarter, are liable to the Distemper. 7. In the middle of the city, in one street, (King-street) of twenty-four who never had passed through the Distemper, only *two*, both in the same house, were attacked. 8. During the summer and autumn of 1777, while this epidemick was general in Chester, many of the surrounding villages, (as, Christleton, Barrow, Tarvin, &c.) and some larger towns, (as, Nantwich, Neston, &c.) were visited by the SMALL-POX in one or more families, yet the Distemper did not spread generally through any of these towns. As both the state of the air and the variolous poison were the same in these places as in Chester, why did it not equally *infect* their *air* as well as our's? 9. At Frodsham, the SMALL-POX began in May, and gradually became
more

more frequent, so as to be remarkably epidemical in one part for several months, yet nearly one half of the town, on the 18th of November 1777, still remained quite uninfected. On the contrary, at Upton, a small village two miles from Chester, of twenty-four children who had never been attacked by the Distemper, all except one (who was also certainly exposed to the Infection) had it in less than two months. The reason of its speedy propagation I shall give in the words of Mr. EDWARDS, surgeon, a very intelligent inhabitant of the place.

‘ The Distemper has not been propagated
‘ by the air, or contiguity of houses, but
‘ has increased in proportion to the com-
‘ munication which families had with each
‘ other; no care was taken to prevent the
‘ spreading, but, on the contrary, there
‘ seemed to be a general wish that all the
‘ children might have it.’ 10. It is uni-
versally allowed, that the Variolous Infec-
tion attacks the children of the poor people
first,

first, and by far the most generally. But the air is equally breathed both by rich and poor, and, if infectious, would equally communicate the Distemper to both, in proportion to their respective numbers. Many instances daily occur of a favourite child living in large towns, where the SMALL-Pox almost constantly rages, who, by anxious care to avoid the Distemper, has escaped it till arrived at maturity, and then received the Infection by Inoculation, or by mixing with society in a less cautious manner. Of many gentlemen's children liable to the Distemper in Chester, not one was seized by the casual SMALL-Pox, whose Infection could not be accounted for, during the whole time of this epidemick.

11. These observations may be deemed too general to determine, with sufficient exactness, to what distance from the poison the air is rendered pestilential. But, as the following fact will ascertain, with some precision, in certain circumstances, the limit
where

where the variolous poison begins and ceases to be infectious, in the open air, I shall endeavour minutely to describe every particular that could be supposed to influence this effect. A gentleman's family, of whom eight were children, all liable to the SMALL-Pox, became inhabitants of Chester in November 1777, having always till then lived in the country. On the 8th of that month, in the afternoon, the weather being showery, cloudy, but not windy, and of a moderate temperature for the season, the eldest, an intelligent young lady, Miss ARCHER, (since married to ROGER SWETENHAM, esq;) from whom I had this information, and three of her brothers, went out, for the first time after their arrival, to view the town. Ascending the walls at the Northgate, they turned westward, and soon met a child of about a year old, in the SMALL-Pox. The pustules were pretty numerous on the face; some appeared fresh and full of matter, others were scabbed. A nurse
had

had the child on her left arm, passed on the north side, between them and the city wall, so that its face was towards the young lady and her brothers. The clothes of neither nurse nor child seemed dirty. The breadth of the path is a yard and a quarter, between the wall of a building on the south side two yards and a half high, and the city wall, on the north side, whose top is one yard and a quarter higher than the path, and six yards above the ground. The young Lady's face was nearly on a level with the child's; her brothers were rather lower. She is certain that she passed within *half a yard* of the child, and doubts whether she was not within a quarter of a yard from it. Her brothers, she believes, were all as near it. The narrowness of the path between the two walls renders this opinion very probable. They all walked exactly, or nearly in the same line with the child, both before and after passing it. Both parties walked uniformly forward in opposite
site

site directions, at a moderate rate, except one of the brothers, who expressed a curiosity to look at the SMALL-Pox patient, stopt a little moment when opposite to it, and about a minute when some yards past each other. The young Lady is certain that he did not touch, but thinks that he approached nearer the child than herself or any of the rest. This brother was the only one of the party who was infected. He was seized with the Eruptive Fever on the 15h of November, that is, on the 10th day after the interview; yet all the other *three* were susceptible of the Distemper, as they were infected by him. They were attacked on the 1st, 2d, and 3d of December; that is, on the 24th, 25th, and 26th day after meeting the child; a longer latent period than has ever been supposed to precede the Variolous Fever. Another brother was seized November 29th, and another sister, December 2d, who had not been on the walls. Though the *three* who
met

met the SMALL-POX patient, passed so near it, yet it is highly probable that none of them, and to a much greater degree, several thousands to one, (see § IV.) that all were not exposed to the Infection. Few medical conclusions can be drawn with such a degree of probability.

As my informer cannot recollect the direction of the wind at this time, but believes that there was little or none, it may be imagined that the Variolous Miasms of the patient might be blown *from* the young party when they passed it. But as they went on the south side of the patient, and as, on this side, the wall was two yards and a half high, it will clearly be conceived impossible, if the wind was southerly; if the wind blew from the west or the east, it must carry the Miasms *towards* them before, or after passing; if it was northerly, they would receive the Miasms as they passed the patient: if calm, they must breathe the air impregnated with Miasms
for

for a considerable way after passing the patient, in walking between two such walls. To some it may appear of importance, that the SMALL-POX was particularly epidemical at this time in Chester, and chiefly in this part of the town; the greatest mortality from this Distemper being in October, November, and December. Besides, all the party were just removed from the fresh air of the country; a change supposed to render them particularly susceptible of Infection. The patient met on the walls seems to have been in the most infectious stage of the Distemper, as appears from the above description. As all the *four* were nearly of the same age, and had all their senses perfect, it appears that the *three* who escaped Infection did not, but the fourth who was attacked did inspire a sufficient quantity of Variolous Miasms to produce the Distemper, either by approaching nearer to the patient than the rest, or by remaining longer in the poisonous atmosphere.

In

In this case, the limit where Infection commenced and ceased seems very nearly determined. It appears reasonable to suppose, that the Infection would have been communicated at a greater distance in the following circumstances; namely, if the pustules had been more numerous, and of a more malignant kind; if the patient had been an adult; if the clothes of the nurse and child had been bedaubed with varicellous matter; if both parties had remained in the same place, and the wind had blown moderately from the patient towards the persons liable to Infection; and, perhaps, if the weather had been hotter and moister. But all these circumstances combined cannot be supposed to extend the infectious atmosphere to the distance of many half yards from a patient in the SMALL-POX.

12. As the fact above related affords a good foundation to judge at how small a distance, in the open air, a SMALL-POX patient exerts a pestilential influence, so
the

the following, which I know to be exactly true, seems to prove this important point, that *the variolous poison in a house is not infectious to any person out of it.*

While I was anxiously meditating on some practicable method of inoculating the poor citizens of Chester, I received intelligence that the casual Distemper had just appeared in a family in Handbridge, a quarter separated from the other part of the town by the river Dee, where I knew that a great number of children were liable to Infection. I went to the mother, ELIZABETH BRYLY, who was very poor, and explained to her the *Rules of Prevention*, (see the annexed PROCEEDINGS, No. V.) which I wished to be observed, in order to prevent any of her neighbours from catching the Distemper. They were left with her in writing; to conciliate her good opinion, I gave her a shilling, and promised ten more, if she punctually and successfully followed my directions. Though ‘two of her children
‘ were

‘ were attacked by the SMALL-POX, and one
‘ of them died; yet, except a boy, who had
‘ been in the sick chamber before the di-
‘ rections were given, not a single child
‘ caught the disease, although two were
‘ liable to it even at the next door, and not
‘ fewer than twenty-six in the near neigh-
‘ bourhood.’ (See the annexed PROCEED-
INGS, No. VII.)—Mr. OWENS, inspector to
the Society, as well as myself, can witness
that these facts are accurately stated.

The girl who died, was for a fortnight,
during the day, in the room to which the
outer door immediately opens. The path
runs as close as possible by the door, where
the children constantly passed and often
played. The door was frequently open,
and sometimes, though rarely, a window
without glass, on the side of the room op-
posite to the door. The atmosphere at this
time was not incapable of impregnation with
the variolous poison and communicating the
Infection, because the girl’s brother and a
neighbour’s

neighbour's child, the only two that had been in the sick chamber, caught it. Yet we may conclude, that of the twenty-six children and perhaps many more, who passed for a fortnight close by the outer door, not *three* were exposed to the Infection is probable to the degree of *several thousands to one* (see § IV.) Few situations could be devised more capable of spreading the Infection. Two circumstances only seemed wanting to produce this effect in the greatest possible degree, that is, the patients were children, who do not generate so much Infectious matter as adults, and the season was cold. But even these circumstances would be more than counterbalanced by removing the patients, or the persons liable to Infection, to a little more distance from the outer door; by which means the Variolous impregnation would be so much *diluted* as to render it harmless. Hence we may fairly conclude, that this Infection can very seldom, *if ever*, be propagated from the inside of a house, especially

especially an inner chamber, to a person in the external air.

The facts here faithfully related, particularly the two last, so fully confirmed the train of argument which had suggested these observations, as clearly to convince me that *the variolous poison did not render the surrounding air infectious to such a distance, as to frustrate all human attempts to stop its progress.*

13. As a farther illustration of this important point, I will relate the following fact, of which Mr. SKERRATT, surgeon, of Malpas, was witness as well as myself. A son of Mr. LEA, near Emral in Flintshire, was attacked by the SMALL-POX on January 1st 1780, had the Distemper very moderately, about twenty or thirty on the face, and in proportion on the rest of his body, and was removed out of the house on the 13th day of the disease, for fear of infecting others in the family. The second was seized on the 19th, the third and fourth

on the 23d of January. But the fifth, the mother, who was much afraid of Infection, and probably more cautious than the rest, did not perceive the Variolous Fever till the 11th of February, that is, till the 43d day after the first began, and the 30th after his removal. All the family endeavoured to avoid any intimate intercourse with the first patient, yet they all, particularly the mother, went every day into his chamber, which was a small one. However, it is manifest, that she was *not infected by approaching very near him, in a small chamber, even during the maturation of the SMALL-POX.*

In the investigation of this subject, it is not only curious but important to inquire, in what part of a room there is the greatest danger of Infection. A striking fact, concerning another infectious Distemper, which we have received on the best authority, may illustrate, if not determine, this point. Sir JOHN PRINGLE* informs us,

* Obs. on the Diseases of the Army, p. 341.

that

that at the sessions of the Old-Bailey, in 1750, the Jail Fever was communicated, from the prisoners, to one part only of the court and jury, by a window at the other end of the room. ‘ The air from the window directed the putrid steams to that part of the court above-mentioned.’ May we not hence conclude, that there is the greatest danger, where the infectious poison is placed between the person liable to Infection and the open air?

§ IX.

Consequently, the SMALL-POX may be prevented, by keeping persons, liable to the Distemper, from approaching within the infectious distance of the Variolous Poison, till it can be destroyed.

If the SMALL-POX be communicated by Infection, (§ I.) and by Infection only, (§ II.) if it be only caught by approaching very near to the variolous poison (§ VIII.) in a recent state, or that has been close shut up
from

from the air ever since it was recent, (§ VI.) and if the Variolous Miasms do not render clothes, &c. infectious, (§ VII. ;) it follows, that the SMALL-Pox may be prevented, by keeping persons, liable to the Distemper, from approaching within the infectious distance of the variolous poison, till it can be destroyed.

The variolous poison, if exposed to the air for a sufficient time, is probably deprived of its infectious quality, being dissolved and diluted by the atmosphere. I have known several instances, (see p. 29, 87) where the SMALL-Pox was communicated in the open air by two persons meeting and walking in opposite directions. Such facts prove that an infectious quality is *quickly* given to the air, and consequently that it may *soon* be exhausted. When the variolous poison ceases to dissolve in the air, it ceases to produce the casual SMALL-Pox. However, it is not impossible, if a large quantity of variolous pus were collected together, that

that a part of the poison might be shut up by dryness on its surface, and become again infectious, on being moistened, at a considerable distance of time. The most certain method of purification is by washing. Water is well known to be the universal cleanser of clothes, &c. from animal filth. Our senses can distinguish when a very small quantity of variolous matter adheres to clothes, &c. and if a few poisonous particles should remain, after washing, the air would probably soon dissolve them.

The *epidemical* SMALL-POX, which has been attributed to a peculiar constitution of the atmosphere, by the sagacious SYDENHAM, and by most other physicians who have since written on this subject, may be supposed incompatible with this conclusion, but I think it can be explained in a satisfactory manner, on the principles of this INQUIRY.

But as particular facts convey more certain conviction than general observations, I
request

request the reader to consider the following Table. The first and second columns are quoted on the authority of my very ingenious friends Dr. PERCIVAL and Dr. AIKIN.

Deaths by the SMALL-POX, in 1781.

	Manchester.		Warrington.		Chester.
January....	3	.....	7	.....	1
February	5	.....	8	.....	0
March	10	.....	5	.....	0
April	17	.....	5	.....	1
May	31	.....	5	.....	0
June	44	.....	6	.....	0
July	55	.....	3	.....	0
August	46	.....	4	.....	1
September	53	.....	3	.....	0
October....	36	.....	0	.....	2
November	31	.....	2	.....	1
December	13	.....	2	.....	1
	<hr/>		<hr/>		<hr/>
	344		50		7

In January, 1781, the SMALL-POX was brought from Dublin to Parkgate, where it was not propagated to a second family. In the same January, it was brought from
Liverpool

Liverpool to Neston, where it continued to spread for several months. Yet Parkgate and Neston are two towns, or rather two parts of the same town, not a single mile distant from each other. I relate this fact on the best authority, Mr. WOLSTENHOLME's, surgeon, of Neston.

Hence we see, on surveying several large neighbouring towns, as Manchester, Warrington, and Chester, that the Distemper is very seldom absent from any of them, but that it becomes generally epidemical at uncertain periods in each, and at times which hold no correspondence with one another. In like manner, on comparing several neighbouring villages, we observe, that some are entirely free from the Distemper, others have a few only infected, others suffer a general seizure.—The observation is generally true in regard to this part of Great-Britain; but it will be thought sufficient to have produced a few particular instances.

Whoever

Whoever considers the numerous facts here faithfully related, will perhaps be convinced, that the Distemper becomes epidemical, neither through any peculiar state of the air, nor of the human constitution. No such difference can reasonably be supposed to exist in large towns within twenty miles of each other, much less in neighbouring villages, and least of all in different parts of the same town or village. If what is above advanced be true, the seeming mystery may be explained in a few words. *The SMALL-POX continues spreading as long as persons liable to the Infection approach patients in the Distemper, or infectious matter, either in the same chamber or very nearly in the open air, and then ceases.* When it has attacked none, or but a few in any place for some years, a large number of the young generation becomes liable to Infection; if, therefore, it be introduced in these circumstances, many of them nearly approach the infectious, become themselves infectious,

infectious, and propagate it to others, so that the Distemper seizes all capable of having it, except a few who are kept from a free intercourse with the rest; this is called the *epidemical* SMALL-POX. In other places, the Distemper does not spread from a SMALL-POX patient, none liable to Infection approaching within the infectious distance, either because it has lately been epidemical, so that nearly all have had it, or because the patient is kept separate from the rest, through his own prudence or their fears. When only one or two families are infected by the SMALL-POX in any town or village, no one will doubt it to be *possible*, that no person liable to the Distemper may come within the infectious distance of the poison, before it be destroyed by washing, or other methods of cleanliness. If this be done by accident or design, I maintain that the Distemper will spread no farther. On the contrary, no one acquainted with the present habits of carelessness in regard to
this

this poison, and how generally it is dispersed in clothes, furniture, and food, will doubt that some of it, while fresh, may come within the infectious distance of some persons liable to the Distemper, and, in consequence, that these will be attacked. The more patients are infected, the more poison will be generated, and, if many in the place are susceptible of Infection, the more quickly and generally it will spread. May not this view of the matter entirely explain the difference between the *sporadick* and *epidemick* SMALL-POX, so often mentioned by medical authors?

II. I have hitherto considered ‘*how the SMALL-POX may be prevented,*’ merely as a medical question. If the conclusion I have ventured to deduce be true, we may next inquire, whether and in what manner it might be capable of a practicable application, either by civil regulations, or by a private society, founded on principles of charity and benevolence to mankind. What
adequate

adequate method can be devised to counteract and correct the prejudices and habits which have long and generally pervaded society? The precept, “*destroy the variolous poison,*” is short and full. But as a popular regulation, the directions ought to be more explicit. Do the following comprehend all necessary restrictions?

“ *Mankind are not necessarily subject to the SMALL-POX; it is always caught by Infection from a patient in the Distemper, or the poisonous matter, or scabs, that come from a patient, and may be avoided by observing the following*

RULES OF PREVENTION.

“ I. Suffer no person, who has not had the SMALL-POX, to come into the infectious house. No visitor, who has any communication with persons liable to the Distemper, should touch or sit down on any thing infectious.

“ II. No

“ II. No patient, after the pocks have appeared, must be suffered to go into the street, or other frequented place.

“ III. The utmost attention to *cleanliness* is absolutely necessary: *during* and *after* the Distemper, no person, clothes, food, furniture, dog, cat, money, medicines, or any other thing that is known or suspected to be bedaubed with matter, spittle, or other infectious discharges of the patient, should go out of the house till they be washed; and till they have been sufficiently exposed to the fresh air. No foul linen, nor any thing else that can retain the poison, should be folded up and put into drawers, boxes, or be otherwise shut up from the air, but immediately thrown into water, and kept there till washed. No attendants should touch what is to go into another family, till their hands are washed. When a patient dies of the SMALL-POX, particular care should be taken that nothing infectious be taken out of the house so as to do mischief.

“ IV. The

“ IV. The patient must not be allowed to approach any person liable to the Distemper, till every scab is dropt off, till all the clothes, furniture, food, and all other things touched by the patient during the Distemper, till the floor of the sick chamber, and till his hair, face, and hands, have been carefully washed. After every thing has been made perfectly clean, the doors, windows, drawers, boxes, and all other places that can retain infectious air should be kept open till it be cleared out of the house.”

“ Though the observance of these rules requires little trouble and no expence, yet every restriction is attended with some inconvenience, especially to the poor; as a recompence and motive of obedience, some reward should be given, and probably their attention may be best secured by annexing to the rules a

“ PROMISSORY NOTE.

DATED,

“ *The SOCIETY for promoting general
Inoculation, at stated periods, and for pre-
venting*

venting the casual SMALL-POX in Chester,
 promise to pay the
 sum of [half a crown or a crown, or]
 as soon as all the scabs are dropt off the
 patients in family, on condition that
 the said and family exactly
 observe the foregoing rules; and allow any
 member of this society, or their inspector,
 to inquire whether they are exactly ob-
 served. And as a farther encouragement
 to follow these directions attentively and
 faithfully, the Society promise [double or
] the reward, if no neighbour
 or acquaintance be attacked by the SMALL-
 Pox, during the time it is in the family of
 the said nor within sixteen
 days after all the scabs have entirely fallen
 off the family.

“ By order of the Society,

Inspector.”

To the inhabitants who are placed above
 want, it would be highly improper to offer
 a pccuniary motive: it may be sufficient to
 annex to the rules the following request.

“ The independent citizens, to whom the rewards of the Society will not be worth acceptance, are earnestly requested to observe the regulations, through motives of humanity, in order to preserve their fellow-creatures from so fatal a pestilence as the casual SMALL-POX; and to permit the Inspector, if they have no other medical visitor, to see that they are observed, lest their servants inadvertently spread the Contagion.”

In order to ascertain with what degree of accuracy and fidelity the rules of prevention are observed, it will be necessary to appoint an INSPECTOR. His office would be to obtain information as early as possible, after the SMALL-POX had appeared in a family; to give them the *gratis* rules or the *promissory* notes; to visit them frequently; and to keep an exact REGISTER, on a plan that may include every necessary information, that can be required to investigate the progress of the Distemper through a town.

An

An actual and not an imaginary example of a register is here given. To explain the utility of the intelligence contained in the different columns of the register, I will anticipate from the PROCEEDINGS of the SMALL-POX Society at Chester, the following CERTIFICATE of their Inspector.

“ GENERAL MEETING of the SMALL-POX SOCIETY, Nov. 4, 1778.

“ I ROBERT OWENS, Surgeon and Apothecary, being the *Inspector* appointed by the *Society for promoting General Inoculation at stated periods, and for preventing the casual SMALL-POX in Chester*, do certify, that each of the following persons has received, of the said Society, the reward of TEN SHILLINGS, for observing their rules to prevent the SMALL-POX from spreading; the numbers here marked referring to the place in their register of the Distemper.

“ 1. Elizabeth

- “ 1. Elizabeth Bryly, Sty-lane.
 3. Anne Collier, Northgate-street.
 4. Hannah Coleclough, Bridge-street.
 7. Elizabeth Ashton, Northgate-street.
 8. Hannah Price, Gorse-Stacks.
 10. Anne Conolley, Bars.
 11. Catharine Jones, Bars.
 15. Mary Morris, Forest-street.
 16. Anne Downing, Bars.
 17. Anne Smith, Buncc-lane.
 18. Elizabeth Tilston, Queen-street.
 19. Elizabeth Johnson, Gorse-Stacks.

“ And I also certify, that the thanks of the Society have been given to

5. Mr. Smith, watch-maker,

13. Mr. Jenkins, tanner,

For observing their rules, though they would not accept any pecuniary reward.

“ I believe that one, and perhaps another, of the above families, did communicate the SMALL-POX to *one* other; but I can certify, that none of the remaining *twelve* families has communicated the Dis-

temper to a single person in Chester, though one or more children, liable to the SMALL-POX, inhabited the next adjoining house in *five* instances, (1, 3, 7, 13, 16;) and though *many* were capable of Infection in the near neighbourhood in *ten* instances, (1, 3, 7, 8, 10, 11, 13, 16, 18, 19) who, with many others, would, I am convinced, have caught the Distemper, if not prevented by the regulations of the Society.—I also certify, that, since the Society has been established, only *seven* persons, (including the two above-mentioned) have communicated the Distemper to another family; of whom I know that *five* transgressed the rules, and believe that the other *two* also transgressed them: That the person who did the most mischief, did it inadvertently; having communicated the Distemper to many before, but to none after, being acquainted with the Rules.

“ I farther certify, that the Distemper has been stopped in *ten* different parts of
the

the city; and that, as far as I can learn from minute inquiries, there are only three SMALL-POX patients in Chester. These effects I believe to have been principally produced by the *Rules*, and the *Rewards*, of the Society.

“ R. OWENS, *Inspector*.”

As an illustration of the register, the inspector ought to write down as a comment on the viith column what may be denominated *Proofs of Infection*. According to the doctrine which I have attempted to establish in the INQUIRY, these proofs may be comprehended in the following questions.

1. Did any person, dog, cat, clothes, food, furniture, money, or other thing, out of an infectious house come near the patient from the 6th to the 16th day before the SMALL-POX Fever began?

2. Is there any evidence that the various poison did actually approach the patient during the period above specified?

The

The latter would be a *positive*, the former a *presumptive proof*, how Infection was communicated.

In the *seven* instances mentioned in the certificate, where Infection was given to another family, it will be proper to state the degree of proof which can be produced in what manner the poison was conveyed.

1. The second family was obliged to change their habitation during the Distemper. One of their children with the SMALL-POX upon her *ran against* a child of the fourth family, who probably carried home some of the poison on her clothes.

2. The sixth family was obliged to return to Liverpool in the Distemper. They had the *single* reward a day or two before their departure, for having so long observed the rules. When they had received the reward, the children were allowed, contrary to promise, to play about the street, and probably transgressed other rules, so as to communicate the Distemper to their next neighbour, the seventh family.

3. The Inspector had no intelligence of the ninth family till the 14th day of eruption. Previous to this time, none of the rules were observed, and some, if not all, of the children who caught the Infection in this neighbourhood, had been in the infectious house. The *dates* of the register prove that the ninth family communicated the SMALL-POX before (yet only a little time before) being acquainted with the rules, to *four* families, (10th, 11th, 12th, 13th) but to none afterwards. This example shews the great probability that the Distemper would have spread quickly, if it had not been prevented by the regulations of the Society.

4. A child of the thirteenth family, with the SMALL-POX upon him, was playing in a street window: he gave a *T totum* through the sash to a boy (in the fifteenth family) unknown to the parents of either.

5. Two cloths that had been made foul by two children who died of the SMALL-POX

Pox in the twelfth family, were sent in that state, to the seventeenth family, in order be washed, in a distant part of the town, near a mile off.

6. It is doubtful from whom the fourteenth family caught the Distemper. None nearer than the tenth house had the SMALL-Pox; and in the intermediate space three children liable to it remained uninfected.

7. The fourteenth was next house to the sixteenth. The nearest neighbour is most liable to transgress all the rules. To be merely in the next house is not sufficient to communicate the Distemper, as appears by *ten* separate proofs specified in the certificate and register. Whoever reflects on the whole train of evidence, will easily believe, that in this and the last case there was some unobserved transgression of the Rules.

In confirmation of the Inspector's testimony, I can add my own, in most of these cases, being extremely attentive to the

PROCEEDINGS

PROCEEDINGS of the Society, from an anxious desire to promote their success.

Another circumstance merits attention. In four instances (4, 7, 17, 20) it is noted in the register, that the second child caught the Distemper from the first in the family; this point is clearly proved by the dates when the pustules appeared. The observation was farther confirmed by subsequent facts: of the thirty-seven cases comprised in the table, p. 33, all except three appear to have been infected by the patient who was first attacked in the house. These facts shew upon what a *casual* circumstance the Infection depended. The poor children of the same family are almost constantly together, and very seldom in separate apartments. Hence we may conclude, that the *whole* air of the chamber in which they lived was not rendered infectious, at the time when the first was infected.

The summer was remarkably hot, and, for three weeks, very wet.

To

To give the facts stated in the register and the certificate their due weight, it is proper to compare them with the following. During this season the SMALL-POX was epidemical in several neighbouring villages. At Christleton, a small village, two miles distant from Chester, the Distemper began in March, and continued there till October. At the commencement of the epidemick, one hundred and seven poor children had never been exposed to the Variolous Infection; of these, one hundred had the Distemper, probably all who were capable of receiving the SMALL-POX.

After this short explanation, may not the following conclusions be reasonably deduced from the facts contained in the register and certificate? 1. That they afford no proof that a patient in the SMALL-POX renders the air, of an adjoining house, or the external air, infectious, even when aided by heat and moisture. 2. That it does not appear from these facts that the Variolous Miasms
render

render clothes, furniture, &c. infectious.

3. That the ‘*Rules of Prevention*’ do not seem to have been insufficient for their purpose in a single instance.

It is highly probable that experience will discover some defects in the regulations: however it may be reasonably hoped that such defects will admit of a practicable correction. These conclusions are deduced from well-authenticated facts; yet I am aware that they will only convince such readers as discern the truth of the theoretical principles above advanced. But if these principles be true, our establishment at Chester is likely to supply observations sufficient to persuade the most sceptical. I could adduce many facts from other infectious Distempers, in favour of the doctrine maintained in the INQUIRY, but suppose that argument from analogy will be deemed superfluous, after so many direct proofs have been produced.

QUERIES.

QUERIES.

1. Do the *Rules of Prevention* contain no unnecessary restriction?

2. Do they comprehend every necessary restriction?

3. Did you ever know *three* or more persons at the same time and place, all escape the SMALL-POX, after being certainly exposed, for the first time, to the Variolous Infection, either by Inoculation with genuine fresh matter, or by breathing the air of a chamber in which a variolous smell was perceptible?

4. Did you ever know the SMALL-POX conveyed out of one chamber into another, by a person who certainly did not carry any variolous serum, pus, or scab, on their clothes, hands, feet, &c.

5. On

5. On the contrary, have you not known numerous instances of persons and clothes exposed to the Miasms of a SMALL-POX chamber, that soon after approached many liable to the Distemper, who were yet not infected?

PROCEEDINGS
OF A
SOCIETY
FOR PROMOTING
INOCULATION,
AND PREVENTING THE
CASUAL SMALL-POX,
In CHESTER.

Inter signa, nullum magis certum aut nobile est, quam quod
ex fructibus. Fructus enim et opera inventa, pro veri-
tate philosopharum, velut sponsores, & fide jussores sunt.

BACON NOVI ORGANI, LIB. 1. § 73.

PROCEEDINGS
OF A
SOCIETY
FOR

Promoting INOCULATION, and preventing the Casual
SMALL-POX in CHESTER.

No. I.

ADVERTISEMENT.

March 13, 1778.

THE havock made on mankind by that dreadful disease the casual SMALL-POX, cannot but excite the pity of every benevolent mind. From accurate registers it appears, that three hundred and seventy-eight persons have died of this Distemper in Chester during the last six years, and that the deaths proceeding from this, compared with those from all other causes united, have been considerably

ably more than as 1 to 6. It is chiefly destructive to the poor, who are not only destitute of the assistance that medicines would afford, but of all the comforts, and many of the necessities, that a sick family demands. Already oppressed with the various evils of poverty, their misery is augmented to the highest degree of wretchedness by this loathsome malady, which, after many bitter sufferings, bereaves them of their children unseen and unlamented.

Several of the magistrates, and other respectable inhabitants of this place, being thoroughly apprized of these circumstances, are desirous that a view of the melancholy scenes should be more fully exhibited to the publick; in a well-founded confidence, that the humanity and generosity of the citizens of Chester would be exerted to provide every possible relief. They request, therefore, that a publick meeting of the inhabitants may be held at the Pentice, on Monday the 16th of March, at eleven o'clock in the morning, for the purpose of inquiring into the degree of this calamity, and of considering whether

many

many lives might not annually be saved by the establishment of *a Society for promoting General Inoculation at stated periods, and for preventing the casual* SMALL-POX. And, to obviate any groundless apprehensions that this proposal might excite, they think it proper to declare, that this design will not be attempted, unless it shall appear (as they trust it evidently will) that it can be executed upon a plan which cannot give any reasonable alarm on account of those who have never had the disease.

As the utility of such an Institution will be in exact proportion to the degree of approbation with which it is received, it is earnestly requested that all who are touched with pity for their fellow-citizens in such complicated distress, will communicate their sentiments fully and freely, either by themselves or their friends, at the publick meeting.

No. II.

At a publick meeting of the inhabitants of Chester, held at the Pentice, on the 16th of March 1778, to inquire in what degree the

casual SMALL-POX had been fatal to our fellow-citizens, it was proved by the *certificates* of the *Clergymen* of each parish, that during the last six years three hundred and seventy-eight persons had died of this distemper, that the whole number of burials, during the same period, was two thousand five hundred and twenty-two, and of births two thousand seven hundred and six.

As there is reason to believe, that the weight of this calamity chiefly falls upon the poor, and greatly aggravates their complicated wretchedness, it was resolved to send the following PROPOSAL to our humane and beneficent fellow-citizens, recommending to their attentive consideration, whether the intended Society would not probably *relieve much misery*, and *save many lives*.

It was also resolved, that another publick meeting should be held at the Pentice, on Monday March 30, at eleven o'clock in the morning, to deliberate on the objections and improvements that may be made to the plan, and finally to determine whether it shall be carried into execution. At this meeting, all
who

who are desirous of promoting the establishment, are requested to declare their intention, and to specify the sum they will give either as a *benefaction* or as an *annual subscription*. The *moderate* contributions of *many* would fix the Society on the firmest foundation. If the design merit approbation, there will never be wanting, in this place, a sufficient fund to supply every necessary expence. On some occasions secret acts of charity are deemed most laudable, but in order to accomplish the benevolent purpose of this institution, the names of the contributors are particularly desired, as they will be requested to exert their farther kind offices of recommending patients, and explaining to their ignorant or inattentive neighbours the humane intention of the Society.

THO. FALCONER, Chairman.

It is proper to declare, that general Inoculation is not intended to take place at the present season, but at such other time as will be most agreeable to the inhabitants in general.

No. III.

A PROPOSAL to establish, in CHESTER, a SOCIETY, for promoting General Inoculation at stated periods, and for preventing the casual SMALL-POX.

IT has been proved by the *most authentick evidence*, that during the last six years the SMALL-POX has been fatal to three hundred and seventy-eight persons in Chester, and, that during the same period, all the births have amounted to two thousand seven hundred and six. Inoculation, since its late improvements, according to the most unfavourable computation, is not fatal to *one* in one hundred; consequently, if the whole number had been inoculated, only twenty-seven would have died, and therefore three hundred and fifty-one lives would have been saved by this art, that have perished by the casual SMALL-POX, or above fifty-eight annually. If we should allow, in a general Inoculation, even *twice* as great a fatality as above stated, on account of the less exact attention of the poor in observing directions, and other causes,

causes, yet still it evidently appears, that not less than *fifty-four* deaths would have been annually prevented;—an important number, especially when we reflect that they are all cut off in early youth, very few of them (only one native and three emigrants in six years) having attained ten years of age. By no other means can human power or skill so greatly diminish the present mortality of mankind.

[* Next to the probability of such a measure being useful, it is important to shew the improbability of its being hurtful to this city. Some persons are incapable of Infection by the SMALL-POX. The proportion of mankind thus exempted has been observed to amount to 1 in 20. By a general survey of Chester, taken after the epidemical SMALL-POX of 1774, it appeared, that all the inhabitants had actually passed through the Distemper, except 1 in 14. (See the Philosophical Transactions for 1778.) The average number of births is three hundred and ninety-

* The argument contained in the crochets was written for, but not printed in, the original PROPOSAL.

seven, which, divided by twenty, will nearly give twenty, the number naturally incapable of Infection; the births, divided by fourteen, will nearly give twenty-eight, the number at present annually exempted, in Chester.* Hence it clearly follows, that all liable to Infection are actually infected, except, perhaps, eight annually: if these were also attacked, it would make less than two more deaths annually by this Distemper. Consequently, if nine were inoculated annually, by such an establishment, the advantage would fully compensate all the possible mischief, even if such a measure were to infect all capable of Infection, a very improbable consequence. Besides, many who were uninfected with the Distemper at the time of enumeration, have undoubtedly been since attacked, so that it appears that the SMALL-POX does nearly the *greatest possible injury* to the inhabitants of Chester.]

A Hospital could never render Inoculation general in this place. The age of admission into such a hospital is at seven years old. In the epidemick of 1777, out of one hundred

* See the INQUIRY, p. 22.

and

and thirty-six who died of it, only seven were arrived at that age, of whom only three were natives, and four emigrants. But if nurses were provided to attend younger children, yet only a few of the most indigent and least affectionate parents would allow their tender infants to be taken out of their own bosom, and inoculated in a hospital. This is an insuperable objection, not to mention the great expence of building and maintaining so large a hospital as would be required for this purpose.

But if all the patients be inoculated at home, the expence will be extremely moderate, and the above-mentioned difficulty entirely removed. No objection to this method can arise from the danger of propagating the Infection; because, if the Inoculation be general, no subjects liable to Infection would remain. But should age, indisposition, or prejudice, occasion a few exceptions, yet even these will run incomparably less risk of Infection from a general than a partial Inoculation. For it will be performed only once in two years, or perhaps seldomer, at a fixed time that

that will be *publickly* known; so that those who never had the disease may easily avoid all intercourse with the infectious. At any rate, they will be in much less hazard than at present from Inoculation, which is performed at *various* times *every* year, and sometimes *secretly*. Not to mention that it would prevent, in a great measure, the imminent danger of being infected by patients in all stages of the casual SMALL-POX that we daily behold in the streets, even in the crowded markets and fairs. If the purpose of the institution can be fully accomplished in banishing the casual SMALL-POX from the place, this circumstance will afford the greatest comfort, and most pleasing security, to those who are liable to the disease. At present this destructive pestilence is seldom or never absent: During the last seven years, and probably a much longer period, a single year has not elapsed without a fatal proof of its presence in this city, as appears from our register of mortal diseases.

It is necessary, but painful, to remark, that the present mode of partial Inoculation,
though

though highly beneficial to individuals, is, on the whole, pernicious to the community. Not more than twenty, or fifteen, or perhaps still fewer, are here annually inoculated; a number that cannot sensibly diminish the mortality of the SMALL-POX in so populous a town, but yet sufficient to propagate the disease, as many hundreds, promiscuously mixt with them through the town, are incautiously exposed to the Infection. It appeared from the general survey, that one thousand three hundred and eighty-five persons had the SMALL-POX in 1774, though many still remained uninfected; previous, therefore, to this epidemick, the chances were very numerous of catching Infection from inoculated patients. And, in fact, many instances might be produced of the epidemical SMALL-POX, occasioned by Inoculation, in various places.—There is another mischief arising from the present practice. Persons, alarmed by the casual SMALL-POX in their neighbourhood, are sometimes inoculated after they have caught the casual Infection. Many supposed failures of success from Inoculation are probably

probably to be attributed to this cause, so that an unjust imputation falls upon this most salutary discovery.

It may possibly be objected to general Inoculation, that young infants must become the subjects of the operation, at a time of life when they are most liable to other fatal diseases, and that the deaths occasioned by other causes may be attributed to Inoculation. This dangerous period reaches at least to two years old. But in the epidemick of 1777, of those to whom it was fatal, sixty-three, nearly one half, were under two years old. The mortality of the Distemper in early infancy is confirmed by many other facts in this and other places. Hence it is evident, that Inoculation must be general in order to be useful to the community. Indeed, whenever young infants can conveniently be taken out of town, or otherwise certainly preserved from Infection, it may be adviseable to defer their Inoculation till the next general period.

It will not be deemed unnecessary to take notice of a groundless prejudice on this subject—

ject—that the SMALL-POX by Inoculation does not certainly exempt a person from the casual SMALL-POX. This disease has some symptoms common to others, and some peculiar to itself. Though no disorder of the human body is generally more distinguishable from all others than the SMALL-POX, yet in some rare instances, both from the casual Infection and Inoculation, doubtful cases occur, where the patient has only the common and not the peculiar symptoms. In a very few of these doubtful cases, the SMALL-POX has succeeded, otherwise they would not have been doubtful. But, in Britain, for fifty-six years, during which Inoculation has been practised, not a *single* example has been produced, where the disease was first *undoubtedly* had by Inoculation, and afterwards by the casual Infection. The plain inference from this observation is, that in doubtful cases followed by the SMALL-POX, the former symptoms had been occasioned by a different disease.

Another opinion concerning Inoculation may require a few remarks. A prejudice too generally

generally prevails, that the matter taken from a SMALL-POX patient, for the purpose of Inoculation, conveys not only this disease but others with which the patient is afflicted. If there were any foundation for this notion, it would afford the strongest argument in favour of Inoculation that could be produced. The casual SMALL-POX is generated by matter that comes from the body of a SMALL-POX patient, and if it also convey all the other diseases of the patient whence it comes, it is surely of the greatest importance that the infectious person should be determined on by choice, and not, as at present, by accident. It would be in vain to attempt particularly to refute every absurd notion that prejudice has propagated on this subject. Every kind of ailment, for many years after Inoculation, is most preposterously attributed to this cause, as if it were expected to exempt the patient not only from the SMALL-POX, but every other disease. Some have imagined that even the scrofula has been propagated by Inoculation, because boils and other abscesses sometimes follow both the casual and artificial

artificial SMALL-POX. But it is sufficient to answer, what every medical practitioner must have observed, that the scrofula is not an infectious disease. However, on this subject, arguments will be less convincing than authorities; and, fortunately, one of the most respectable can be produced.

The *learned delegates of the faculty of Medicine at Paris, appointed to inquire into the advantages or disadvantages from Inoculation of the SMALL-POX*, sent, in 1764, some questions on this important subject, to the elder Dr. ALEXANDER MONRO, of Edinburgh. The testimony of this gentleman, near the close of a long and illustrious life, must be of the greatest weight both on account of his eminent skill in medicine, anatomy, and surgery, and the improbability that he could then be influenced by any interested motives. But not contented with giving his own opinion, he sent these questions to most of the medical practitioners in Scotland, being connected with them as their teacher in various branches of physick. His answers, therefore, are drawn from the united testimony of nearly
the

the whole kingdom—from observations on five thousand five hundred and fifty-four cases, by ninety Physicians and Surgeons, besides those of Edinburgh.

“ 2. Do you know that other diseases have been ingrafted with the SMALL-POX by Inoculation?

“ A. I never saw other diseases communicated by Inoculation; and my correspondents agree with me in this negative.

“ 2. Whether did other diseases happen more frequently or seldomer after Inoculation than after the casual SMALL-POX?

“ A. My correspondents seem all to agree, that there are not near so numerous or various bad consequences after Inoculation, as after the SMALL-POX by natural Infection; and when I assure you that I have been so fortunate, or perhaps timorously cautious, that not one of those whose Inoculation I advised, had a dangerous symptom during the disease, nor a bad consequence from it, you will conclude that I must be of the same opinion with them.”

Indeed

Indeed the prejudice, even of the common people, against this salutary art, appears to be greatly abated by their seeing such numerous examples of its wonderful success. For whole villages in this neighbourhood, and many other parts of Britain, have been Inoculated with one consent. And it cannot be supposed that the inhabitants of towns are more ignorant or more obstinate. There is not a reasonable doubt that our poor fellow-citizens would eagerly and universally embrace a proposal to preserve their children from death and deformity, if the intelligent and opulent would humanely exert their influence and assistance to carry it into execution.

I. A PROPOSED PLAN FOR A GENERAL INOCULATION.

Suppose,

1st. That five shillings, or for each poor patient, be allowed to the inoculator.*

* The medical members of the Society unanimously declined to accept any pecuniary recompence for inoculating their poor fellow-citizens. And the reward for nursing, after the first general

2d. That two shillings, or be given to the parents who are most indigent, as a reward for nursing each of thcir children properly during Inoculation. [Or, suppose five shillings be appointed as a reward for nursing a single child, and two shillings for each of the rest.]

3d. That a subscriber of a GUINEA shall have the privilege of recommending three persons to be inoculated with the rewards, or four that do not require them; and so in proportion for any larger sum. That a subscriber of HALF-A-GUINEA shall recommend one patient with the reward, or two without; of SEVEN SHILLINGS, one patient with the reward; of a CROWN, one without it. Whatever alteration is thought proper in the rewards, &c. the number of patients to be recommended by each subscriber must accordingly be changed.

4th. That a benefaction of TEN GUINEAS shall give the privilege for life of recommending the same number of patients as the annual

neral Inoculation, was thought improper. So that all the contributions of the establishment are now expended in preserving the town from the Infection of the casual SMALL-POX.

subscription

subscription of a guinea; and after the same rate for greater benefactions. Though this sum, in so healthy a situation as Chester, be less than the calculated proportion, yet as such benefactions, if sufficiently numerous, might give a permanency to the establishment, they would, on this account, more effectually promote the benevolent purpose of the institution.

5th. That the Surgeons and Apothecaries of Chester, who are desirous to assist in the execution of this charity, offer their service to the Society; that the subscribers approve of those who are known to have sufficient skill and experience in Inoculation. That the town be distributed into as many districts as there are inoculators appointed, one of whom is to be allotted to each.

6th. That the Physicians attend gratis, whenever desired by the inoculators.

7th. That a general Inoculation may be performed every second year, or perhaps at longer periods, taking care, in the interval, to prevent the casual SMALL-POX from spreading Infection among the young generation.

L

8th. That

8th. That the independent citizens, who do not want the assistance of this charity, be earnestly requested to defer Inoculation till the general period; and that the medical practitioners be desired to use their influence for the same purpose: if circumstances require this rule to be transgressed, to acquaint the Society, that they may take measures to prevent the propagation of Infection.

9th. That a contributor who does not reside in Chester, shall have liberty to appoint a person to recommend patients in his name.

10th. That no innkeeper allow any person to be inoculated in his own house. This regulation is greatly for his own interest, as well as the publick good. If it be strictly observed, as it easily may, strangers may pass through the town during the time of general Inoculation, without being exposed to the danger of Infection. At present, fear of the SMALL-Pox prevents many of the neighbouring gentry and others from frequenting the place, greatly to the disadvantage of the inns, as well as all the trading part of the town.

II. PROPOSED REGULATIONS FOR PREVENT-
ING, AS MUCH AS POSSIBLE, THE PROPAGA-
TION OF THE CASUAL SMALL-POX.

Suppose,

1st. That in the interval between the periods of Inoculation, an exact account be kept of the name, street, and time when each family begins and ceases to be infected by the casual SMALL-POX. That in order to obtain the earliest information on this subject, a small reward (as half-a-crown, or a shilling, or) be offered to the parents, or any other person, who first gives notice to the Society, that a fresh family is infected.

2d. That a promissory note of be given by the Society to the parents of the infected family, payable a month after the SMALL-POX has ceased in that family, on condition that they had practised faithfully the proper methods of preserving their neighbours and acquaintance from Infection, in which they shall be fully instructed. The reward might be doubled if their endeavours were

were successful, which would always be the case, if the Rules were strictly observed. This disease is communicated by infectious persons, clothes, &c. and the poison might certainly be destroyed by cleanliness, and other easy methods of purification. The small additional expence of these rewards would probably be supplied by the surplus of the inoculating fund, as every subscriber would scarcely recommend his full number of patients. But if there should be any deficiency to support these regulations, one Charity Assembly would supply a fund of rewards for many years, if it produced no larger a sum than in this city is contributed by that means, once at least every winter, to relieve a single distressed family.

As, perhaps there never was an attempt to keep so large a town as Chester free from the casual SMALL-POX, surrounded by towns and villages where it spreads without controul, it might be apprehended, that the proposed method of preservation would be impracticable. The regulations, therefore, judged sufficient for this important purpose, if *exactly* observed,

observed, are submitted to the publick consideration. As they are neither difficult nor expensive, it is hoped that the well-disposed will observe them from motives of humanity, and others, under proper inspection, from motives of profit.

[The RULES OF PREVENTION, which are printed in the INQUIRY, p. 107, were inserted here.]

N. B. All objections or improvements that relate to any part of this proposal, are requested to be freely communicated to the publick meeting.

No. IV.

FORMS OF CERTIFICATES.

1. I certify, that No.

is intitled to no reward; as I have seen this family transgress the *Rules of Prevention*, or received authentick information of such transgression, during the time they were ill of the SMALL-POX, particularly in the following instances, namely,

Inspector.

Dated

2. I certify

2. I certify, that I have frequently visited the family of _____ No. _____ during the time they were ill of the SMALL-Pox, and that I never discovered, or heard, that they transgressed the *Rules of Prevention* in a single instance. But there has probably been some unobserved transgression of the Rules; as _____ child of their neighbours, or acquaintance, has been attacked by the SMALL-Pox, either during the time it was in the said family, or within sixteen days after it had ceased therein, on the _____ of _____. But as _____ of their neighbours remained uninfected, _____ is consequently intitled to *half-a-crown* reward.

Inspector.

Dated _____

3. I certify, that the family of _____ No. _____ have faithfully observed the *Rules of Prevention*; and that none of their neighbours or acquaintance has been seized with the SMALL-Pox, either during the time it was in this family, or for sixteen days after the last scab had dropt off, which happened _____

pened on the of ; though
 children liable to the Distemper live within
 doors of the said family.

is consequently intitled to the full reward of
five shillings.

Inspector.

Dated

4. I certify, that the family of
 No. have faithfully observed the
Rules of Prevention; and that none of their
 neighbours or acquaintance has been seized
 with the SMALL-POX, either during the time
 it was in this family, or for sixteen days after
 the last scab had dropt off, which happened
 on the of ; though children
 liable to the Distemper live within
 doors of the said family. is con-
 sequently intitled to the thanks *of the Society*,
 as *will accept no pecuniary reward.*

Inspector.*

Dated

* The *Certificate* is an improved method of transacting
 this business; and may suggest a farther improvement. The
 xith column of the *Register*, p. 112 of the INQUIRY, may give
 the “*Date and kind of Certificate*,” which will be useful in-
 formation.

No. V.

No. V.

[GENERAL CERTIFICATE, 4th November
1778. See the INQUIRY, p. 112.]

No. VI.

PARAGRAPHS FROM THE CHESTER
NEWSPAPERS.

1. We have had authentick information that ELIZABETH BRYLY (a poor woman in Sty-lane, Hanbridge) received the reward of TEN SHILLINGS, on Thursday the 9th of this instant April, 1778, from *the Society for promoting General Inoculation, at stated periods, and preventing the casual SMALL-POX, in Chester*; because she hath faithfully and *successfully* followed their directions. Twelve weeks ago two of her children were attacked by this dreadful Distemper, and of so malignant a kind that one of them died; yet, excepting a boy who had been in the sick chamber before the directions were given, not a single child has caught the disease, though
two

two were liable to it even at the next door, and not fewer than twenty-six in the near neighbourhood. Although this event happened before the Society was established, yet the poor woman was thought to deserve the reward, because, by following their rules of prevention, she had given a seasonable check to the Distemper, which had not been in this part of the lane, nor generally epidemical in Handbridge, for three years, so that had it spread from her children, it might probably have soon destroyed great numbers in this quarter of the town.—We are informed, that the future meetings of the Society will be held at the Infirmary every Tuesday morning, immediately after the business of the House is transacted; and that Mr. OWENS, of the Infirmary, will receive contributions to the charity from any who are desirous to keep the town free from the casual SMALL-POX, and to save the lives of their fellow-citizens by Inoculation. He is authorised to give a *reward* to any person who first communicates information that a fresh family in Chester is infected by the SMALL-POX.

2. At a General Meeting of the SMALL-POX Society, held the 9th of November 1779, at the Infirmary, it appeared from the report of the Inspector, that since November 4, 1778, the Distemper had been stopt, by the regulations of the Society, in thirty-seven different places of Chester, that in thirty-two of these it had been stopt without infecting a second family, and in three, out of the remaining five places, after infecting a second family only, in the neighbourhood: that from want of early information, and other irregularities, it had spread more generally in Boughton than any other part of the town; the number at present ill of the Distemper in that quarter being seven, in all others eight. It appeared to the Society very practicable to prevent the SMALL-POX from spreading in Chester, if cordially *assisted* by their fellow-citizens. The chief mischief has arisen from want of early intelligence. If the benevolent and humane would give *immediate* information to the Inspector, Mr. OWENS, as soon as a fresh family is known to be attacked by the SMALL-POX, they would not only save much expence
to

to the charity, but the lives of many inhabitants. A Committee was appointed to meet the first Tuesday of every month, to extinguish the Contagion, by distributing rewards, and executing other regulations for that purpose.

The *thanks* of the Society for observing their *Rules of Prevention*, without any pecuniary reward, were given to Dr. DENTON, Mr. HARRISON, Mr. RIDGWAY, Mr. WALKER, Mr. RATCLIFFE, Mr. PRATCHITT, Mr. PALIN, Mr. BUSHELL, Mr. WHITTELL, Mr. BENNION, Mr. BACKARN, and particularly to Mr. BRAMWELL, for directing such regulations to be faithfully executed as prevented the SMALL-Pox from spreading through the Workhouse, though several had been infected there before the Distemper was discovered.

December 7, 1779.

3. At the Monthly Meeting of the SMALL-Pox Society, on the 7th instant, it appeared, from the Inspector's report, that the number of SMALL-Pox patients in this city had this month decreased from fifteen to seven, of whom three are strangers; and that the Contagion,

tagion had been extinguished, during the last month, in four different places of the city. On this occasion, several received the rewards of the Society for preventing the Distemper from spreading, who had many next-door neighbours liable to the SMALL Pox, and yet not one of them caught the Infection.

No. VII.

To _____ Member of the
SMALL-POX SOCIETY.

The SMALL-POX Society has been established near two years. During this time, the Distemper has been frequently brought into Chester from the neighbouring towns and villages, appearing in different parts of the city, so that no person, liable to be infected, could have walked with safety on our walls or in our rows. The regulations of the Society have prevented the danger of catching the SMALL-POX, not only in these places of publick resort, but have, in numerous instances, stopt its progress among the poorest class of our inhabitants, who were surrounded, even at the next door, by children liable to
the

the Distemper. The money expended in rewards, besides the purpose of checking the fatal ravages of the casual SMALL-POX, has also afforded a most seasonable relief to many distressed families, whose poverty and wretchedness were greatly aggravated by the visitation of such a pestilence. You have the satisfaction to reflect, that, under Providence, your bounty has been the means of saving the lives of many children, who would otherwise have perished by this destructive Distemper.

Inoculation, at proper intervals, was from the first made a part of the benevolent institution; since, as the SMALL-POX continued to prevail unchecked through the rest of the kingdom, there would obviously be little advantage in securing the inhabitants of Chester from a disease while young, which they would inevitably catch as soon as they were old enough to have any intercourse with their neighbours. It is now judged expedient to propose general Inoculation, in order effectually to preserve the young generation hitherto spared from the casual SMALL-POX. That the attempt can do no harm, there is the clearest

clearest evidence to prove. It appeared from authentick facts* laid before the GENERAL MEETING, that previous to the establishment of the Society, the SMALL-Pox prevailed so generally in Chester, and so nearly did all the mischief it was capable of producing, that if only nine patients were to be inoculated annually by this institution, it would counterbalance all the possible injury that could be effected by more extensively spreading the Contagion. On the other hand, the advantages to be gained by suppressing the casual and communicating the inoculated SMALL-Pox, are the greatest that human art can bestow, in respect to the preservation of life. And as the good to be derived from this charity will be exactly in proportion as it is generally accepted, we earnestly intreat you to disperse, by a servant, the inclosed *Address to the Inhabitants of Chester*, and to explain to your ignorant and indigent neighbours and dependents the benevolent purpose of the Society, and to exert all your influence over them, not to neglect the offered blessing. You are authorised, by the unanimous resolution

* See the PROPOSAL, p. 133.

lution of the General Meeting, to recommend as many patients as you may judge proper. If you should be absent from Chester at the time of general Inoculation, we request that you will immediately appoint some resident citizen to recommend patients in your name. If any should persist in rejecting the good intended them, warn them, in strong terms, of the danger and criminality of wantonly catching Infection from inoculated patients: indeed the most solicitous care will be taken that *these* shall not spread the Distemper, unless their uninoculated neighbours shall be guilty of the most willful and blamcable negligence.

After mature deliberation, it has been judged necessary to give *rewards* to the most indigent parents, in order to allow them the means of subsistence while nursing their children under Inoculation, and to secure their strict attention to all medical directions. Many of our fellow-citizens earn their daily bread by their daily labour. We trust that none will be recommended for the *rewards* but such as are proper objects of the Charity. The
money

money which has been so generously and humanely bestowed, it is hoped will be prudently and judiciously expended.

By order of the General Meeting,

THOS. FALCONER, Chairman.

Chester, Feb. 11, 1780.

No. VIII.

REPORT OF THE SMALL-POX SOCIETY, CHESTER.

General Meeting, March 27, 1781.

We judge it necessary to acquaint our fellow-citizens with our proceedings, since the General Meeting of February 11, 1780.

In deference to the opinion of some respectable persons, an attempt was made, last Spring, to inoculate our poor people in an hospital. A commodious house, in a convenient situation, was fixed on for the purpose. After a week spent in inquiries for patients, by all the inoculators, not a single person could be found in Chester, who would enter an hospital for the sake of inoculation. The society then inoculated eighty-five children,
each

each at their own houses. The most solicitous care was taken, for a fortnight before Inoculation, to preserve these patients from the casual Contagion, every where dispersed among them, and, after they became infectious, to prevent their communicating it to others. They all recovered. Indeed not one of the whole number had a dangerous complaint during, or in consequence of, the disease, though the casual SMALL-POX, at that very time, was remarkably fatal in the town. It is reasonable to expect, that such success will render Inoculation generally desired at a future period. Inoculation did not, as some might apprehend, spread the Contagion, but appeared to produce a quite contrary effect. For in the districts where most patients were inoculated, there remained the fewest in the casual SMALL-POX; and, in the districts where the smallest number were inoculated, the Distemper was afterwards most general. We believe that only two were infected by inoculated patients; one of them was concealed from the inoculator, in the same house with a patient; the other

had free intereourse with the infectious, being supposed to have before had the casual SMALL-POX.

It may be proper to explain, why the easual SMALL-POX spread generally through the town in February, March, and April, 1780; the Contagion was manifestly propagated by a new-raised regiment of soldiers, who were under no controul, being without their surgeon, and scarcely under the command of their officers, who did not receive commissions till their departure from Chester. One of these soldiers, walking about the town, with the SMALL-POX upon him, in the most infectious stage of the Distemper, was desired by our Inspector to take care that he did no mischief by spreading it. His answer explained the conduct of them all; “ Nobody takes care of me, and I will take eare of nobody.” Many of these soldiers had the SMALL-POX, and spread the Distemper in every part of the city; the patients were so numerous and so widely dispersed, that a single Inspector could not possibly see that the Rules were observed. On this consideration, the regulations were
suspended

suspended for some months. In future, the most attentive care of the Society will be exerted to guard against the return of such a calamity.

The regulations for preventing the casual SMALL-POX were again established on the first Tuesday in May. The town was then divided into six districts, each under the care of an Inspector. During that month, the Distemper was in twenty-five families; and in five out of the six districts. It appears, from the report of the Censors to the Committee, that in all these places, except one, the Contagion was totally extinguished on the 17th of June: That, in this district, the Distemper was only checked, through the imperfect execution of the regulations, but not stopt, till the 9th of December, and till these irregularities (well known to the Committee) were corrected: That, during this period, the SMALL-POX appeared in two distant parts of the town, but the Contagion was stopt in both places without infecting a second patient: That, since the above-recited perfect extinction of the Contagion, it has been brought

brought into Chester twice from Liverpool, and once from Coventry: That the *Rules of Prevention*, in two instances, (E. WILLIAMS,* Crook-lane, and MARTHA BILLINGHAM's, Cow-lane) have preserved from the Contagion *two* persons, never infected, in the *same house*; and, in another instance, (JOHN RAWDON's, Handbridge) *three* persons, never infected, in the *same family* with a patient in the casual SMALL-POX, during the whole disease. Such numerous examples have occurred to the Society, of preventing Infection being communicated to persons liable to it, in the closely adjoining houses, that it would be tedious to mention them; and, indeed, must be thought superfluous, after the more difficult and more doubtful point has been ascertained, that they may be preserved while dwelling in the same house, and the same family.

At present, there is not a single patient ill of the casual SMALL-POX in Chester.

From these *facts*, of which any person who entertains a doubt may easily be satisfied,

* In this instance, the Inspector had mistaken some other eruption for the SMALL-POX; as WILLIAMS's child had afterwards this Distemper.

it appears evident to the Society, that their regulations to prevent the progress of the SMALL-POX will be successful as far as they are executed. They add, with great satisfaction, that no citizen has transgressed the Rules in a single instance, except through inadvertency; and no stranger, except the soldiers above-mentioned.

Though the Contagion is now so perfectly extinguished in this city, yet danger every where surrounds us. We are credibly informed, that the casual SMALL-POX rages with destructive violence in Liverpool, Manchester, Shrewsbury, and many other towns and villages in our neighbourhood; so that we cannot hope to preserve the inhabitants of Chester from this fatal malady without the steady attention and constant charge of the Society.

The Committee expend, with strict œconomy, the money intrusted to their care. They hope to deserve the approbation of every subscriber and benefactor, and of others of their charitable fellow-citizens, who only withhold their bounty till they are convinced that this humane

humane institution will answer the ends for which it was established. The transactions above faithfully related, it is hoped, will help to produce such conviction. The money already subscribed is considerably less than will be required. The Society, however, have no apprehension, that, in Chester, there will ever be a deficiency of charitable aid for such an humane purpose as securing our fellow-citizens from so loathsome and so fatal a disease as the casual SMALL-POX.

By order of the General Meeting,

THO. FALCONER, Chairman.

No. IX,

REPORT OF THE SMALL-POX SOCIETY
AT CHESTER.

General Meeting, Sept. 17, 1782.

This institution having existed four years in March last, and there having been two general inoculations, we shall review the principal facts that have occurred to our observation.

Last spring, one hundred and twenty-eight poor children were inoculated by the members

bers of the SMALL-POX Society; these, added to the eighty-five inoculated in the spring of 1780, make the whole number two hundred and thirteen; during the last four years, two hundred and three private patients have been inoculated: in all four hundred and sixteen. Two infants have died after Inoculation, though there are doubts, in both cases, whether in consequence of that operation: there was reason to suspect that one of the patients had previously received the casual Infection, and the death of the other might not improbably be attributed to a disorder of the bowels. Hence its degree of mortality in Chester, since the Society was established, if both the deaths above-mentioned were occasioned by Inoculation, has been only 1 in 208. The dreadful fatality of the casual SMALL-POX is so well known, that it seems impossible to account for the reluctance which the common people still have to partake of the benefit of this salutary art.

We will next state the difficulty and the success of our endeavours to prevent the progress of the casual SMALL-POX. The same
people

people who refused Inoculation, and they are a large proportion of the inhabitants, are fearless or rather desirous that their children should be infected with the casual SMALL-Pox. It is with concern we remark, that in one part of the town (Cross-Gun-Entry, Forest-street) the inhabitants, disregarding the Inspector's exhortations, have purposely propagated the Distemper, carrying the poison, and even the patients, from one house to another, without reserve. In consequence of this conduct, it spread through fifteen families, infecting all in this Entry liable to it, and proved fatal to several. In another quarter, the poor people allowed their children to have an unreserved intercourse with the infectious. This irregularity in part proceeded from their ignorance that some money might be obtained by observing the Rules. The hope of procuring the reward has had some influence on their conduct, and the Infection is nearly extinguished, though many of their neighbours are liable to receive it. These two instances of irregularity, though very unfortunate, yet when contrasted with the numerous facts

facts where the progress of the Distemper was stopt by observing the Rules, afforded the clearest proof how useful the preventive regulations might become, if properly observed.

However wonderful it may seem, we believe, in several other cases, that the parents who rejected the proposal of inoculating their children, purposely exposed them to catch the casual Infection. Though some of our fellow-citizens are so careless in dispersing the deadly poison of the SMALL-Pox, yet they would regard with horror any person who should purposely administer arsenick or any other deadly poison to innocent infants.

Their conduct clearly proceeds from a popular delusion, which it is our duty to correct and oppose. It is manifest that many lives may be saved by the preventive regulations of the Society, and yet the most prejudiced eye cannot discern or suspect that they can be productive of the least possible mischief. Such unaccountable infatuation will surely not always prevail. As, in their situation, the SMALL-Pox is clearly unavoidable either by the casual or artificial Infection, we may
hope

hope that reason, and the example of their more intelligent neighbours, will, ere long, teach them to prefer Inoculation, which is more than twenty times less dangerous, and occasions less than a twentieth part of the pain and misery. If these hopes be well founded, (and they are founded on a very general principle in human nature, paternal affection) the chief difficulty with which this Society has contended, will proportionably diminish.

Soon after the Society was established, the casual Distemper began to spread so quickly in Handbridge, through the irregularity of the inhabitants in this remote part of the town, and our funds were at that time so low, as to cause an apprehension that the rewards of prevention might become too expensive; on these considerations, the regulations were suspended in that quarter for some months; during the *suspension*, sixteen died of the casual SMALL-POX in this parish; and in the spring of 1780, the Distemper was spread so widely by soldiers, as explained in the last Report, as to occasion a *general suspension*
of

of the regulations for some months; during this time, the deaths by the casual Distemper amounted to fifty-eight. Taking the whole period of four years, ending March 30, 1782, the SMALL-POX has been fatal to one hundred and thirty-nine, or thirty-five annually. If we deduct the above-mentioned sixteen and fifty-eight, who died during the interval when the regulations were not executed, the total deaths would be only fifty-five, or annually fourteen; whereas the annual average of deaths by this Distemper, for six years previous to the establishment of this Society, was sixty-three. Hence its fatality has been actually reduced to near *one half*; and, if we may deduct the numbers who died during the two periods when the regulations were suspended, to near *one fifth*. This degree of success will appear wonderful to any one who impartially considers how disadvantageous the prejudices above described must prove to our proceedings, as they so generally and so constantly counteract the endeavours of the Society to prevent the Contagion from spreading: the fatality of this Distemper may be reduced to
near

near a *twentieth* part, that is, from sixty-three to three, if all the inhabitants and their neighbours anxiously united their endeavours to avoid the casual, and to obtain the inoculated, SMALL-POX.

The Inspectors were particularly instructed to observe, whether the casual SMALL-POX was received from inoculated patients. On the most careful inquiry, one private and one or two publick patients appeared to have communicated the casual Distemper; and, in all these instances, the persons infected had unreserved intercourse with the infectious, without any wish to avoid them.

Since the last Report the SMALL-POX has been extinguished, where several in the neighbourhood were liable to Infection, in a great many parts of this town.

During the year 1781, only eight persons died of this Distemper in Chester, of whom two were infected *in* Manchester, a third *in* Liverpool, and a child of the fourth *in* Coventry. Though the Contagion has been so often extinguished, yet it is again brought so frequently among us from the neighbouring towns

towns and villages, that Chester has not been perfectly free more than a few weeks, since the Society was established. The Distemper has been, for some months, in various parts of the town: After a difficult and expensive struggle, the Contagion is again nearly extinguished. At present, the SMALL-POX is only in *four* families in Chester. Considering what great numbers are liable and willing to catch the Infection, this happy success must be attributed to the attention and vigilance of the Inspectors.

The medical members have unanimously declined to accept the offered gratuity for inoculating the poor patients; deeming the heart-felt satisfaction of preserving the lives of their fellow-citizens a sufficient recompence for their trouble.

On mature consideration, we have thought proper to abolish the rewards to the inoculated patients. At the first general inoculation, the measure appeared necessary to overcome inveterate prejudices; but it now seems to hold out an improper motive, which would have a pernicious influence. It is regarded
by

by many as a bribe to do what they think wrong. To have the children of our poor neighbours preserved, as far as in our power, from death and misery, should be the only, and is surely a sufficient, inducement for them to *accept of gratis* inoculation.

The two principal expences of this establishment are thus taken away. The chief charges which remain, are the salaries of the Inspectors, and the rewards to infectious families for observing the Rules of Prevention. The great attention and diligence of the Inspectors amply deserve the salaries which they have obtained: Indeed their services have been thought highly to merit other *honorary* rewards. The money for observing the Rules is only given to the poorest families, and at a season too when poverty is most distressing, on the visitation of a most loathsome Distemper. Independent of every other consideration, the humane could not find more proper objects for their charitable relief. The fear of incurring greater expence than our funds can supply, has induced us to offer too small rewards to infectious families. At present a
perfect

perfect observance of the Rules intitles the family to five shillings only: A greater reward would command more care and attention, and would, of consequence, be more frequently successful.

For this humane and beneficent purpose, we are sorry to observe, that our fund is likely to become deficient, and are therefore under the necessity of again soliciting the charitable aid of our fellow-citizens and other well-wishers to Chester. If the deficient sum could be supplied by small *subscriptions* of a *crown*, or *half-a-guinea*, or a *guinea*, annually, or by proportionable *benefactions* for life, or by small *occasional donations*; and if all the members of the Society would cordially unite their influence to prevent the casual Contagion from spreading; we have reason to hope that our endeavours to check the ravages of this fatal Distemper might be attended with much greater success. On this occasion, such charitable aid would be particularly seasonable; because, if the regulations be now suspended, and, without fresh contributions, our income may not be sufficient, as appears
from

from the annexed account, its destruction of the poor children would be dreadful. In many of the surrounding towns and villages, the SMALL-POX now generally and fatally prevails. It will be often brought among us, and fresh expence will frequently be incurred to stop its progress. As the greatest mischief has arisen from a want of early notice, when the Distemper appeared in a family, we earnestly intreat the humane, whether a subscriber to the charity or not, particularly all affectionate parents, who wish to preserve their children from this mortal malady, to send immediate information to the Inspector of the district, below named, as soon as they hear a fresh family is infected.

It is with the sincerest satisfaction we observe, that our example has excited a like beneficent spirit toward the poor inhabitants of other large towns. In Leeds, they had a general Inoculation in the spring of 1781, and proposed another in 1782; in Liverpool, a general Inoculation was successfully executed in the autumn of 1781, and another in the spring of 1782, and they have resolved on
a general

a general Inoculation there *twice every year*. Such has been the success that has attended these exertions at Chester, Leeds, and Liverpool, that the Royal College of Physicians at Edinburgh have appointed a Committee to inquire into their mode of conducting the gratis Inoculation of the poor, in order to diffuse the benefit of this salutary art among all ranks in the metropolis, and probably other large towns of Scotland. And it may be reasonably expected that the same benevolent disposition which has promoted general Inoculation in these places, will, ere long, be employed to check the progress of the casual Distemper, an important object which has principally engaged the attention of our Society ever since its establishment.

Of all the children who died in Chester under ten years old, during the six years which preceded this institution, a *full third part* died of the SMALL-POX. It is probably fatal to as great a proportion of the young generation in other large towns of Great-Britain. If, in the places above-mentioned, their Physicians, who are so highly and so

justly celebrated for knowledge and humanity, would establish regulations to prevent the propagation of this deadly pestilence, our united example and influence might prove of great importance to our country and to mankind.

THOs. FALCONER, Chairman.

	£.	s.	d.
<i>Receipts</i>	199	2	6
<i>Disbursements</i> for four years	170	3	0

Inspectors, Mr. WARRINGTON, Mr. MEACOCK,
Mr. CONNAH, Mr. VENABLES, Mr. LIGHT-
FOOT, Mr. JACKSON.

General Inspector, Mr. OWENS.

Secretary, Mr. WILKINSON.

CONCLUSION OF THE INQUIRY,

ADDRESSED TO THE

MEDICAL READER.

I Submit to your deliberate consideration, as a question which it is peculiarly your duty to determine, whether it is medically possible to prevent the SMALL-Pox. A dark cloud of vulgar prejudices has long obscured this subject. But all the mischief appears to have originated from the two opinions particularly discussed in the INQUIRY; namely, 1st, “That clothes, &c, “are rendered infectious by Variolous Miasms;” and 2d, “That the atmosphere “of the place in general is contaminated, “where the SMALL-Pox is epidemical.”

While

While these opinions prevail, it must be deemed most absurd to propose any human means to prevent the Distemper.

I have attempted to prove that no person will be ever attacked by the SMALL-Pox, except after “ Infection by *nearly* approach-
“ ing a SMALL-Pox patient, or the variolous
“ poison in the state of serum, pus, or scab.”

If this proposition be true, and if the medical faculty, with the more intelligent part of mankind could be convinced of its truth, the chief difficulty would be vanquished. If it were generally known that the SMALL-Pox is produced by a peculiar poison which might be certainly destroyed, and which could never do mischief, except through carelessness or malevolence, it would soon be thought as criminal, being infinitely more destructive, for a person to convey the variolous poison to those who are liable to Infection, as to mix arsenick with their food. On this foundation, I venture to suspect that medical errors have led man-
kind

kind into the most pernicious *habits*. If this suspicion be well founded, it is the duty of Physicians to re-consider this important question with due deliberation.

I shall shortly state the evidence, which the experience of the SMALL-POX Society, during six years, has uniformly supplied, to refute these two opinions. Some explanation and apology may be required, by the medical reader, for the mode in which the PROCEEDINGS of the Society are composed.

I wrote them as a citizen of Chester, not as a physician; otherwise, the numerous facts which they contain, might have been applied, in a much more direct manner, to prove the doctrine maintained in the INQUIRY. In regard to the *truth* of the facts which they briefly state, it should be observed, that they are ascertained with a great degree of authenticity, by a Committee, consisting of all the medical, and many other intelligent, members of the Society. The poor people, who claim re-
wards,

wards, come regularly before these gentlemen every month. The full reward is not to be obtained, except by those who have preserved *all* their neighbours and acquaintance from the Infection. Besides a written certificate from their Inspector, they are examined in presence of others, who have in some instances transgressed the Rules, and whose reward is consequently diminished: these would complain of injustice, if there were any pretence for complaint. In regard to the other facts related in the INQUIRY, I have generally quoted the authority of medical witnesses in confirmation of my own testimony. Many of their names* are universally known, and highly respected by the medical world; and the judgment and veracity of them all are acknowledged by their numerous acquaintance. Names and dates are always mentioned, so that, if any doubt should arise, inquiry may still be made, concern-

* See the INQUIRY, p. 31, 32, 33, 46, 97, 102, 103, 178.

ing such recent events, whether the narrative be accurately true.

1. During the whole period of six years, the progress of the SMALL-POX has been carefully watched by the Inspectors, and the cause of Infection investigated with all possible diligence and attention: but not a single fact has occurred to excite a suspicion that Variolous Miasms, adhering to clothes, had communicated the Distemper. Yet, during the whole period, except a few weeks, all the medical practitioners occasionally visited SMALL-POX patients, and the Inspectors daily entered the infectious chambers; In the same clothes, without the least reserve, they approached children liable to the Infection, but, in no instance, were known or suspected to have communicated the Distemper. A body of such evidence must remove every rational doubt.

2. The SMALL-POX Society have had proofs still more numerous and positive, that the infectious atmosphere, which surrounds the

the

the variolous poison, is limited within a small circumference. The facts stated in the 87th, 93d, 97th, and 113th pages of the *INQUIRY*, exhibit the clearest and fullest evidence on this point; they establish it so far beyond all controversy, that I purposely omitted, in the future *PROCEEDINGS* of the Society, any other proof, as altogether superfluous. But it may be proper to declare, that the whole experience of the Society has uniformly confirmed this opinion. During the last six years, few weeks have elapsed, without supplying positive proofs that the infectious influence did not extend to the closely adjoining houses. Yet all medical readers may recollect numerous instances, in that period, when this Distemper has prevailed, in other towns and villages, so as to become generally epidemical.

But on a point where the conclusion may lead to such important consequences, I am solicitous to be instructed by the united wisdom and experience of my medical brethren.

brethren. If the arguments of the *INQUIRY* be erroneous, the *Queries* annexed to it seem well adapted to detect such errors. To these, I beg leave to solicit the particular attention of the medical reader. If you answer the 1st, 3d, or 4th query in the negative, I request an exact detail of every circumstance concerning the facts on which such an answer is founded.

The Letter from Dr. WATERHOUSE* is curious and instructive. It is much more satisfactory to say, that the SMALL-POX has been exterminated, than that it might be exterminated, by civil regulations. However, I would not propose the proceedings of Rhode-Island as an example for imitation. They seem to have been suggested by fear, not by reason and a clear discernment of the danger. They have established many unnecessary restrictions and difficulties. Among these, I would reckon the tremendous coffin, in which the patients were shut up alive; their transportation to a desert island; board-

* See Appendix I.

ing up the street; placing guards to keep passengers at a distance from the infectious house; and many other troublesome and useless regulations. It is probable, that these unnecessary difficulties, and the supposed peculiar advantages of a small island so near the capital, Newport, may have been the cause why their method of exterminating the SMALL-POX has not been more generally imitated. Dr. WATERHOUSE computes the inhabitants of Newport to be about eleven thousand. The rest of the island is fully peopled. Besides the principal port, there are, I believe, two or three ferries, and those nearly adjoining the several large towns on the Continent. It is the great thoroughfare between the northern and southern Provinces. I have been informed, on good authority, that there are two roads, the whole length of the island, one for horses, hilly and nearer, the other for carriages. Their connection with foreign countries is remarkably extensive.

tensive. Combine all these circumstances together, and I doubt whether there be another island in the whole world, whose intercourse with their neighbours and with distant countries is so general, and, consequently, no island is so liable to receive the variolous poison from every quarter. The inhabitants of Britain are comparatively in retired and remote situations as to the danger of receiving foreign Infection. Dr. WATERHOUSE observes, that the SMALL-POX is more commonly brought from the neighbouring Continent, than distant countries; that is, by the market-people, and travellers, that come by the ferries, than by ships arriving at their principal port. But Britain has no such near communication with her neighbours by ferries.

However, this country is by no means prepared for such a proposal. To correct the pernicious errors and habits that have universally pervaded the kingdom, no means could possibly prove so effectual as the establishment

establishment of SMALL-POX Societies, to stop the ravages of this dreadful pestilence. In large towns, there would be most difficulties to contend with ; because, in them, the SMALL-POX is generally present ; and never feared or avoided. But, even in large towns, the difficulties are such as would rather animate than discourage the truly benevolent mind. The Distemper, in such places, does every possible injury.* The attempt is so far from being attended with any hazard, that some benefit must result from any preventive regulations, even should they fail of being completely successful. I entertain sanguine hopes that medical gentlemen may form associations on disinterested, benevolent principles. They are the most frequent witnesses of the deplorable sufferings occasioned by this loathsome Distemper. Their thoughts, in the daily exercise of their profession, are so constantly and so anxiously exerted to save life and to relieve misery, that they enjoy, perhaps, a higher satisfac-

* See the PROCEEDINGS, p. 133.

tion

tion than others from the gratification of these humane sentiments. On these considerations, a proposal which would answer both these benevolent purposes in no inconsiderable degree, will probably receive their most strenuous support. They can best obviate the difficulties, discern the advantages, and demonstrate the practicability, of such a plan. They may promote such establishments with all the zeal that their humanity dictates, without incurring the remotest suspicion of a self-interested motive. The moderate expence of such an institution can no where be an object of difficulty; on the contrary, it may be reasonably hoped, that the most intelligent and humane inhabitants, forming themselves into a Society, on the purest principles of beneficence, by transfusing this spirit into the breast of each other, and of their acquaintance, would excite, among all ranks, an anxiety and active exertion to promote its success.

Strongly

Strongly impressed with an opinion, that the most important advantages may result to our country and to mankind, from a medical combination to check the ravages of this destructive pestilence, I take the liberty of addressing the gentlemen of the profession most distinguished for their knowledge and liberal sentiments. The prevention of diseases is certainly the most beneficial, and ought to be the most honourable, branch of medical science.

From the degree of success with which our regulations to prevent the SMALL-POX have been executed at Chester, though generally opposed by the most untoward prejudices, I have not a doubt, that the casual Distemper might be in a great measure excluded from any district whose inhabitants, to avoid this dreadful pestilence, would willingly and gladly accept of Inoculation. Such institutions, wherever established, would immediately preserve the lives of a large proportion of the young generation.

generation. But their beneficial consequences would be infinitely more important. By due perseverance, they would probably correct the medical errors and superstitious opinions which have so long and so fatally deluded mankind. On facts publicly ascertained, to the full conviction of the more intelligent part of society, there might be safely and successfully founded a general law to promote Inoculation, or, what would be incomparably more easy, and more grateful to the feelings of humanity, to establish regulations that would *exterminate the SMALL-POX from Great-Britain*.* To attain so important a blessing would require the general, united, and persevering exertions of our legislators and magistrates, as well as the medical faculty. It would employ much time and labour, executed with assiduous zeal, care, and attention. No service could deserve to be more amply rewarded, if we estimate its value by the multitude of lives it would preserve, and

* See Appendix II. 3.

the infinite variety of human misery it would prevent. To accomplish a plan so beneficial to our country, and to humanity, would be highly honourable to our profession, and unspeakably grateful to every heart warmed with the generous ardour of patriotism and philanthropy.

APPENDIX

TO

THE INQUIRY.

I.

IN Autumn, 1778, the preceding INQUIRY was submitted to the consideration of my judicious friends, the late Dr. FOTHERGILL, and Dr. WATERHOUSE. At that time, I did not know that the SMALL-POX had been excluded from any civilized country in the world: and was not a little rejoiced to learn from Dr. WATERHOUSE, that, what I conjectured to be practicable, had been actually accomplished, for a long series of years, in Rhode-Island. The annexed account was written in answer to some queries I had proposed. It is so clear and satisfactory as to require no comment.

A LETTER FROM DR. BENJAMIN
WATERHOUSE.

“ Lea-Hall, 25th Sept. 1778.

“ I have not forgot the promise I made to Dr. HAYGARTH when we were last conversing upon the SMALL-POX, of sending to him an account of the means used in my native island which so effectually secures us from the rage of that dreadful disease. As it is upwards of three years since I left America, it is possible I may have forgotten some of the circumstances, but I believe I retain the most material.—It will be necessary to say something of the situation of Rhode-Island, and the connection of its inhabitants with other parts.

“ Rhode-Island is fourteen miles long and seven broad; about six miles from the Continent on the west side, scarce half a mile on the east, and open to the sea on the south. This island is the thoroughfare for all travellers from Connecticut, New-York,

York, Jerseys, Pensylvania, and all the southern provinces. On the shore of the Continent, opposite the east side, stand the towns of Bristol, Warren, Tiverton, and some others, none of them containing less than a thousand inhabitants, some of them three times the number. Over this ferry come almost all the market people. To these add the great number of people who come by the great road from Boston, and parts adjacent to Providence; from which place boats are constantly carrying passengers to the capitol *Newport*. This town contains about eleven thousand inhabitants; it is advantageously situated and esteemed very healthy, insomuch that it is resorted to every summer by great numbers on account of their health, from the West-Indies and the southern provinces.

“ The Measles, the Chin-Cough, and ulcerated Sore-Throat, have been several times epidemick. But I do not recollect that any of these Distempers were frequent
among

among us, without seizing, nearly at the same time, the inhabitants of the neighbouring provinces.

“ Newport is a very considerable seaport; their ships visit almost all the ports of Europe, the coast of Africa, the French, Spanish, Dutch, and Portuguese settlements in the West-Indies. Ships from these parts do not so frequently bring the SMALL-Pox as from the ports nearer to us.

“ As Inoculation is discouraged both in Boston and Rhode-Island governments, those who wish to be inoculated go to some of the southern provinces, where it is tolerated. Different places in Pennsylvania, New-York, and the Jerseys, are annually resorted to, by great numbers of the New-England people. Long-Island was a favourite spot with many. I have known the young people of half a dozen families set out together for these inoculating places, and return to their homes together, and yet we have so conducted matters as to prevent
this

this dreadful disease from spreading among us;* which is done by observing the following Rules.

“ Never to bring back any of their clothes worn during their stay at the inoculating place. Never to quit it till a certain space of time fixed by the inoculators, be the disease ever so slight. And, if they have any sores about them, when they arrive in the harbour, not to come on shore till they are examined by the Inspector appointed for that purpose.

“ When any person in the town is suspected of having the SMALL-POX, they send for the Inspector. If he thinks it is probable the person is infected, he takes with him some of the *Overseers of the SMALL-POX*, and if they, in conjunction with a practitioner, pronounce it the SMALL-POX, the family has little more to do with the patient, who is, from that time to the conclusion of the disease, wholly under the

* See the *INQUIRY*, p. 13, where this fact is farther authenticated.

direction of these officers, who remove him to an island where every thing convenient is already provided. This island is called *Coaster's Harbour*: it is a mile and a half in length, and about a mile in breadth: It is pleasant, and sheltered by the Continent from the north and east winds, is about half a mile from Rhode-Island shore, which shore is between two and three miles from the town.

“ Formerly, they carried the sick person in a box, in form of a large chest, big enough to contain a small bed. The cover was perforated with holes sufficient to give the patient air. The box was put on an easy sledge and drawn by a horse, attended by the *Overseers* to the shore, when the box and sledge together were put into a boat, and in a few minutes the patient was in his hospital. When the inhabitants found that this formidable apparatus did more mischief, especially to timorous minds, than the disease itself, they dropt the use of the box, and substituted a sedan chair.

“ It

“ It has happened more than once that the disease was so far advanced, before it was known to be the SMALL-POX, that the patient could not be removed without the utmost hazard. In that case, they boarded up the street, advertised it in the newspapers, and placed guards to prevent any person from coming within a certain distance of the house.

“ When a vessel arrives in the harbour, with the SMALL-POX on board, after the sick are taken to Coaster’s Harbour, she is obliged to perform quarantine, and hoist a jack in her shrouds, in which case no boats will board her. But, in common, commerce suffers no restriction on account of this Distemper.

“ I acknowledge some of these Rules are unnecessary and inconvenient, but the dread of this disorder induces the people to adhere to them with cheerfulness. A stranger would be ready to conclude that they could not be so scrupulously complied with, without

out exerting an authority disagreeable to the people. But it is not the case. For the united voice of the people coinciding with the magistrates; gives every regulation its wished-for effect; so that it rather appears like a popular custom than the restraints of law.

“ The *Overseers* are generally persons of consequence, are very punctual in the duties of their office, and are intitled by law to something for their trouble.

“ If there is any thing else Dr. HAYGARTH wishes to know, and I can inform him of, he has only to direct a few lines to me, at Dr. FOTHERGILL’s, and it will be communicated to him with the greatest cheerfulness, by his Friend,

“ B. WATERHOUSE.”

APPENDIX.

ADDITIONS

TO THE SECOND EDITION.

II.

1. **W**HEN a Physician of talents, with a spirit of professional improvement, is placed in an advantageous situation, he becomes a blessing to mankind. It is generally known that Dr. WOODVILLE, as physician of the SMALL-POX Hospital in London, has employed his opportunities to the most beneficial purposes.

I am glad to quote, on so good an authority, some facts which confirm observations which I had advanced in the INQUIRY, (p. 40-42) relative to the Various Infection of the unborn foetus.

Extract

*Extract of a Letter from Dr. WOODVILLE,
dated November 20th, 1793.*

“ Several curious facts are to be found in the histories of Variolous Infection communicated by the mother to the fœtus in *utero*. If the mother miscarries, or is delivered of a child at the regular time while she labours under the SMALL-Pox, the infant is without variolous pustules, of which I have known five instances at the Hospital. But if the pregnant woman pass through the disease, and be brought to bed within five or six weeks after the time of her being attacked with the SMALL-Pox, variolous pustules are very generally to be observed upon the child, as I have had occasion to witness. This is conformable to Dr. MEAD’S Remarks, and the various histories published in the Philosophical Transactions, so that the SMALL-Pox of the child is consequent, and not *uno ictu* with that of the mother; and it is probable, that at the time of suppuration of the pustules
of

of the mother, the child is inoculated by the absorbed matter carried through the parent's blood to that of the foetus.* And though I have seen no malignant kind of foetal SMALL-POX, yet history records such; so that Inoculation in this way does not produce a more mild disease in general than that by casual Infection; and this fact seems to shew, that the greater malignity of the casual SMALL-POX than the inoculated does not depend upon the Variolous Miasmata being inhaled into the lungs. Why by the ordinary way of Inoculation the disease should be comparatively so trivial, has employed much of my attention to account for it in a rational and satisfactory manner."

"Since my election to the SMALL-POX Hospitals, I have attended between two and three thousand cases of SMALL-POX; and as I have exhausted all my invention in various experiments and remedies, I am begging the assistance of my friends."

* See p. 42.

2. *Extract from my Answer to Dr. WOODVILLE, dated January 6th, 1794.*

“ Why the artificial SMALL-POX is milder than the casual, is a difficult and important question. I am glad that you so properly employ your time and talents on a subject which it is peculiarly your duty to investigate. Your invitation to suggest experiments, which may afford hints for future inquiry, I am well disposed to accept.

“ The Variolous Pus may, perhaps, be composed of two ingredients; a volatile part, which occasions the casual SMALL-POX, and a fixed part employed in Inoculation; the former being more virulent than the latter. If variolous matter were distilled, would it thus be rendered more malignant? In the SKETCH, (p. 460) you will find a curious fact related by Dr. J. CURRIE, which proves that the variolous matter is not wholly soluble in air, in the
usual

usual temperature of the atmosphere. Does it again become volatile by warmth, and would variolous pus kept in the heat of the blood continue to emit infectious effluvia till all the poison had evaporated? Suppose you were to collect a quantity of variolous pus in a glass; let it be dried in the heat of 98°. By adding a little moisture, let it be again restored to the consistence of pus, and then evaporated to dryness in the same temperature.—Repeat the moistening and drying of the same pus ten or twelve times. Then make a trial whether the variolous matter, which has undergone such a process, can produce the SMALL-POX by Inoculation. If it does, I should conclude that the artificial and casual Infection proceed from distinct portions of the poison.”

The idea which I had conceived, is exactly the truth; as is fully proved by the following decisive experiments, which gave me great satisfaction.

Extract

*Extract from Dr. WOODVILLE's Answer,
dated April 24th, 1794.*

“ I have delayed answering your Letter longer than I could wish, with the view of speaking decidedly on the experiments which you have ingeniously suggested, and which an attention to the more general duties of my profession has not even yet permitted me to accomplish very completely.—Variolous pus diluted with six times its weight of water, and slowly evaporated till it loses its fluidity, and the process repeated six or seven times, still leaves a residuum capable of producing the variolous disease by the ordinary method of Inoculation; but if the pus is burned upon a hot iron, so as to lose its cohesion, and to become perfectly friable, then reduced to an impalpable powder, and mixed with water, it becomes incapable of exciting the SMALL-POX by Inoculation; its activity, therefore, seems to remain as long as it preserves its tenacity, and this is all I can with certainty say on the subject.”

3. The discovery of Vaccine Inoculation by Dr. JENNER is the most fortunate and beneficial improvement that medical science ever accomplished. It does not, however, preclude the necessity of investigating the nature of the variolous poison, and of considering by what regulations its propagation may be prevented. In order to secure the unthinking multitude from this destructive Pestilence, measures to prevent the casual SMALL-POX should every where accompany Vaccine Inoculation. Without such protecting care of the wiser and more humane part of society, this mortal malady would for ages lurk unheard of and unsuspected, to the annual destruction of many thousands: no town, no village, nor even a single solitary house, could enjoy perfect safety from the danger.

In 1793, I published a *Sketch of a Plan to exterminate the casual SMALL-POX*. That measures to accomplish a purpose of such high importance to mankind are already
ready

ready commenced upon the Continent of Europe, will appear from the following extract:—

“ Mémoire adressé au Congrès de Rastadt concernant la petite vérole.

“ Une Société de Médecins répandue dans toute l'Allemagne et dans la Suisse, s'est réunie, il y a quelque tems, pour essayer de mettre des bornes aux maux que la petite vérole fait souffrir à l'humanité. Un plan relatif à cette entreprise a été soumis au jugement de tous les médecins et plus de trois cent nous ont déjà communiqué sur ce point l'exposé de leurs opinions. Un ouvrage periodique continue à rendre compte des démarches successives de la société, des ravages annuels du mal variolique, des mesures qu'on lui oppose, &c.

“ Presque tous les Gouvernemens de l'Allemagne, instruits de ce projet, ont déclaré positivement qu'ils en favoriseroient l'exécution, et ils ont adopté, à ce sujet, la mesure déjà souverainement salutaire, que chaque année, les listes des individus morts de la petite vérole, dans le cours de l'année précédente, seroient envoyées en un lieu déterminé dans chaque païs, pour être, ensuite, transmises (avec les observations que les medecins jugeroient à propos d'y joindre) au rédacteur soussigné du journal en question. En outre les medecins ont déjà commencé à établir de leurs propres fonds une caisse commune, destinée à subvenir aux fraix que necessitera leur entreprise.

“ Un écrit qui sera publié en Latin et en François, exposera dans peu les résultats des efforts combinés de cette association, et l'on aura soin que cet écrit parvienne à tous les Gouvernemens de l'Europe.”

“ Halle ce 8 May, 1798.”

The

The Memoir here quoted was sent to me along with a translation of my SKETCH into the German language; yet no notice whatever is taken of my plan in this paper, though entirely borrowed from it.

This silence it may be difficult to explain. Perhaps Dr. JUNCKER, Professor of Physick in the University of Halle in Saxony, who presented this Address to the Congress at Rastadt, might be apprehensive, lest any notice of transactions honourable to the English nation would offend the French Commissioners. Such apprehensions, however, it should seem, are entirely groundless. From the "*Mercure de France*," a periodical work, which gives an account of new publications, it is manifest that the French Reviewers, with a liberal spirit, and without betraying any political enmity or envy, honour English authors, who advance the knowledge of literature, or of the sciences, with a full tribute of praise.

On bidding this subject *farewell*, it will not be improper to notice a circumstance which is extremely curious, and which history will record as highly honourable to our national character. While France, Spain, Holland, Russia, Prussia, Sweden, Denmark, and Italy, are leagued together to crush this little island, because she entered into a war in support of religion, morality, true liberty, and good government; England, with the most active philanthropy, is communicating to all civilized nations a discovery which can effectually destroy the SMALL-POX, the most mortal enemy that ever afflicted mankind.

Dr. WOODVILLE himself took a journey to Paris, to instruct the French nation in the practice of Vaccine Inoculation. With a true medical spirit of beneficence this most wonderful and salutary discovery has been already communicated to Spain, Portugal, Minorea, Malta, Constantinople, Vienna, Berlin, and other parts of Germany,
Sweden,

Sweden, Denmark, and probably to all Europe. I had the good fortune successfully to convey the first Vaccine Contagion to the inhabitants of America through Professor WATERHOUSE. In less than three years after the publication of this discovery, with a zeal and alacrity beyond all example, it has been transmitted to all, or nearly to all, the enlightened people upon earth. Such a transaction is highly glorious to the English name and to the medical profession.

APPENDIX.

III.

*Copy of a Letter from WM. HEBERDEN,
M.D. F.R.S. and Fellow of the College
of Physicians.*

“ Accept my thanks for the favour of your Plan for exterminating the casual SMALL-POX. It was sent in the summer
to

to my house in Pall-Mall, while I was in the country, and I have just had time to read it since I returned to town. The zeal and ability which you have manifested upon this very important subject, will do you a lasting honour. By the numerous facts you have collected, and by the solid judgment you have shewn in the conclusions, which may be made from them, you have greatly illustrated the nature of Infection, than which no medical question has been involved in greater obscurity. Your part has been abundantly done for rescuing mankind from the ravages of this destructive Pestilence; and the great truths you have established, will, we hope, in time, make their way, and the practice be adopted, which you have so ably recommended. But a business of this kind will go on but slowly, and sometimes seem to have a final stop put to it, not only from its magnitude, but from indolence, prejudice, interest, envy, and wrong-headedness. This common fate of all
great

great and new undertakings should never discourage the adviser from persevering; for every useful truth, fairly laid before the world, however it may seem at first to be slighted, will gradually undermine the old errors, and in time prevail over all opposition.

In reading one part of your book, I was reminded of a Nobleman, who having learned to bleed, was uncommonly fond of practising it: he accordingly bled one of his servants, who happened to be taken ill, and some of the blood flew upon his lip. He and all his family had been strongly prejudiced against Inoculation, and they all lived in perpetual dread of the SMALL-POX. The servant grew worse, and I was sent for; and very much alarmed his master by declaring, that the servant had the SMALL-POX. However no harm happened; neither the blood, nor the fright, having been able to produce the Distemper.

Though I have lived to such a great age, I have only found time to draw up a rough
sketch

sketch of a *Praxis Medica*, collected from what I had heard, and observed, and had written down in the chambers of the sick. This I have given to my son, who is one of the Physicians of St. George's Hospital, desiring him to correct such mistakes, and supply such deficiencies, as experience shall point out. If among his descendants there should be more Physicians, who will continue to do the same, it might perhaps, after a few generations, become a work of some use.

“ With my best wishes of success to all your benevolent designs, I am,

“ Dear Sir,

“ Your's sincerely,

“ W. HEBERDEN.”

Pall-Mall, Dec. 24, 1793.

REMARKS.

The publick will thankfully receive the interesting intelligence which this Letter contains. Though written at a late period of life, it expresses, with uncommon energy and truth, sentiments which may have important influence on the most beneficent and wisest part of society. In the prosecution of researches to discover the nature of Infection by which Distempers are communicated, and in devising regulations to prevent such calamities, the plans which I have recommended may appear visionary and impracticable to many readers. To have them sanctioned by a character of such respectable authority, gives me the most cordial satisfaction. So decisive an opinion of so celebrated a Physician will silence many idle objections.

In the former Edition of the INQUIRY, Dr. HEBERDEN supported by his testimony some conclusions which I had deduced from
facts

facts which had occurred to my own observation, in order to ascertain at what period of the SMALL-POX a patient begins to be infectious. He agreed with me that ‘one
‘ who never had the SMALL-POX might
‘ safely associate with a variolous patient,
‘ for the two or three first days of eruption,
‘ without receiving the Infection,’ (p. 46.) The intelligence now communicated in his letter fully confirms this conclusion. The fact here related, though casual, proves as clearly as any single experiment contrived on purpose, that the blood, during the Eruptive Fever of the SMALL-POX, is not infectious.

Every medical reader, who is attached to his profession, will learn with much concern, that the *Praxis Medica* of such a physician as Dr. HEBERDEN was destined by the modesty of its author to be withheld from the world for such a distant period of time. Some years ago, I expressed to his son, Dr. WILLIAM HEBERDEN, my great
regret

regret that mankind would be so long deprived of the benefit of such valuable observations. He informed me, on this occasion, that his father had given him leave to dispose of this manuscript, after his death, in whatever manner he pleased, and that it was his intention to publish it. From a Letter written since this event, I have very great satisfaction to announce to my medical brethren the following very interesting intelligence:—‘ My father’s observations are not intituled “ *Praxis Medica*,” although that is his own expression in his Letter to you. I believe it will be published first in Latin, and will probably be called “ *De Morbis Liber*.” I have it in Latin and English, both originals, at least, both written by himself.’ An accurate description of diseases, taken from nature, and a faithful account of the effect of medicines by such a sagacious observer, and for such a long period of time, must contain a body of knowledge highly conducive to the advancement of medical science.

Since the date of this Letter, several years have elapsed, in which the Editor, or rather the associated Author of the *Praxis Medica*, has had excellent opportunities to fulfil the important duties assigned to him, which he has undoubtedly improved to the best advantage. Of his superior qualifications for this purpose none will doubt, who has read his late *Observations on the Increase and Decrease of Diseases*. All must highly approve his diligent and intelligent researches into medical authors, and the bills of mortality; his important and fair conclusions from numerous well-authenticated facts; the learned and ingenious manner in which he has expressed his doubts; and the elegant and perspicuous language in which all the observations are communicated.

While this sheet was in the press, the news of the death of Dr. HEBERDEN arrived. In lamenting the loss of my venerable Friend, so eminent for his medical knowledge,

ledge, and for his profound erudition; so punctual in all his religious and moral duties; so usefully employed through the largest part of a long life in restoring health, and alleviating diseases; we have the consolation to think, that a character so highly honourable to his profession, to his country, and to mankind, will be remembered and revered to the latest posterity.

PATER, O RELICTUM
FILIO NOMEN, PIETASQUE.

HOR.

FINIS.

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1. A SKETCH *of a Plan to Exterminate the SMALL-POX from Great-Britain*; with a Correspondence on the Nature of the Variolous Contagion with Mr. DAWSON, Dr. AIKIN, Professor IRVINE, Professor WALL, Professor WATERHOUSE, Dr. PERCIVAL, Mr. HENRY, Dr. CLARK, Dr. ODIER, Dr. CURRIE, and the MAGISTRATES OF GENEVA. Two vols. boards. 8s.

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April 2nd

sa. Well. Morning of the 5th, April was first of the
to the laboratory. Small box
the belly with it is to be pouring from
out of the Uterus in the form, the having
in. Discharge in the body similar to the
small box —



Accession no. 24059

Author Haygarth:
An inquiry how to
prevent the
small-pox. 1801.
Call no.

Inoc.

Vacc

